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ABSTRACT

The first part of this publication contains detailed presentations on the subject of planning in education for Norway, The Netherlands, and the United States; a summary of the educational planning program for 18 OECD countries; a commentary on the substitution of teacher input by "other resources" input; and a description of the Educational Policy and Research Center at Syracuse. This part is followed by a commentary on the various perspectives of the country planning programs, such as some unstated assumptions on which educational planning and research are based, planning in the midst of socio-educational change, and suggestions for possible lines of further development in a country's planning program. The publication concludes with a consideration of the perspectives and methodology of educational planning. Topics examined include the educational problems of a future society, the educational plan as a viable instrument of social policy, and the forecasting of plausible alternative future histories of society. A scenario of alternative futures for the United States between 1970 and the year 2000 and its implications for educational policy is presented. The appendix provides lists of the names and addresses of conference participants. (Author/DN)

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LONG-RANGE POLICY PLANNING IN EDUCATION

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PREFACE

This publication contains the papers and proceedings of a recent meeting of the OECD country representatives for Educational Planning. This was the first meeting under the education programmes of the OECD (the 14th in a series of educational planning meetings dating back to seven years) to deal specifically with the problem of long-term perspective planning in education.

Two developments had been evident: Educational planning had been institutionally established in the great majority of Member countries and was assuming increasingly practical roles in the operational affairs of national educational systems. Secondly, in what might be termed the general field of planning there is a growing "specialisation" in "the long-term future" - a group of academics and thinkers who specialise in developing more systematic and inclusive techniques for looking into various aspects of social development in terms of their long-term perspective. Representative groups from both these fields attended this meeting.

A confrontation of these two developments involves at least the question of whether official educational planning can reach out to span the gap between the particular political reference points of its day-to-day operations and the often disconcerting insights that may come from a long-term analysis of education in society. This confrontation also raises the problem of how educational planners can make use of the techniques being developed in this kind of analysis.

It would seem that this was only the beginning of such complex but exciting confrontation, in which the "realism" of the planners was measured against the vision of the futurologists. As the texts show, the positions were not as far apart as may at first appear. In fact, the OECD country authorities for education have since demonstrated that they are increasingly accepting long-term planning as a basic commitment for the further development of their programmes in educational policy planning and this commitment is reflected in continuing OECD work in this field.

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Part One

EXAMPLES OF LONG-TERM POLICY PLANNING IN EDUCATION FROM OECD COUNTRY PROGRAMMES

I

BACKGROUND FOR LONG-TERM EDUCATIONAL PLANNING: THE PROGRAMMES IN EIGHTEEN COUNTRIES

Note by the Secretariat

1. INTRODUCTION

The OECD country programmes in educational planning as they were reported and interpreted in the Summer of 1969 provide the broad context of the papers and discussions presented in this book. Reports were submitted by 18 of the OECD countries on their planning programmes. An analytical summary of these reports by the Secretariat was discussed, corrected, and accepted as a basic description of these country programmes as a whole. The following essay summarizes this Secretariat report and the relevant discussion.

The purpose of these presentations and discussions was not confined to description but included useful criticism. This was made abundantly clear as an underlying agreement developed among the participants, summarized by Prof. Stephen Graubard, that the documents presented showed first, that the planning authorities had generally failed to sense the widespread alienation of the public from education, and particularly, from the universities; second, that there was a failure to study in depth the nature of the new mass student population which is so vastly different from even recent generations, or the new mass teaching force which is no longer - even at university level - a protected élite.

These points of agreement were related to the fact that the discussion of those aspects of the country reports dealing with the operation and organisation of the planning process focussed on problems of broadening involvement in that process. One of these problems was that such involvement is called for at a time when only advanced, thoroughgoing and, in many instances, sophisticated planning activities can promise a significant impact on current educational policy. Thus, planning authorities for Norway, Denmark, United States, Sweden, The Netherlands, Japan and Austria were all at some stage of response to their governments' requests for long-term perspective planning for education. It was agreed that the major task was to develop the requisite techniques to support such programmes.

A third point of agreement, however, emphasized that the country planning authority is only one of the competing forces engaged in this task. Kjell Eide called attention to the idea that planning is an activity, among others, aimed ultimately at changing the behaviour of the people involved - in this case - in education. Thus, planning is seen as an educational endeavour itself which develops its own pedagogy and spreads the use of this pedagogy widely or strategically in an effort to affect key points in the society which generate educational experience.

The particular planning pedagogy with which this book is mainly concerned is long-term perspective analysis and planning for education: a more detailed account of the operational/organisational processes and of the substantive issues reported in the country programmes indicates how this planning pedagogy might function.

2. THE PLANNING PROCESS: BROADENED INVOLVEMENT

It was evident from interventions by many countries that the organisation of the planning process primarily involves its extension to new groups and levels - to regional, state (provincial), and local governments; to the general and local publics; and to the classrooms, the teachers, and the students as they participate in change and innovational activity.

The problem of regional planning and state and local planning was emphasized by the Austrian representative, in the light of the growing involvement in his own planning programme of local and regional planning efforts and considerations, and by the representatives of Switzerland, Yugoslavia, Germany and Canada, who described some of the problems in the substantial growth of educational planning in the localities, states, Länder or provinces which control education in these countries. In some cases it was noted that such local planning initiative increased the need for appropriate central support. The United States reported a growing interest in federal support of independently functioning planning agencies for education at various geographical levels as a particularly appropriate role for central government in this field. There was a clear indication that this was an area calling for further study within the OECD programme.

The growing public and political interest in planning was illustrated in Ireland where active public involvement at crucial stages of educational development planning has been necessary to carry it forward. Such involvement can also be difficult, as shown by the United Kingdom experience where educational planning research has raised sharp political interest since it has been related to sweeping reforms, such as the development of the comprehensive secondary schools. Ministry officials found that what they regarded as proposals for mere "technical", scientific inquiry aroused sufficient political discussion to make the field difficult for the researchers. Another example cited was United States' experience with widespread political interest and action based on public perception - wrong or right - of the relationship between planning studies, problem identification, and proposed policy measures. The local political resistance and reaction to the massive sociological policy investigation of equality of educational opportunity conducted in the United States during the late 1960s was particularly noted.

The role of teachers in planning, as it becomes involved in the actual implementation of reform in the field, was raised by the representatives of Italy and the United Kingdom, who stressed that any development planning for significant changes in the way the schools manage the learning process must be concerned with change in the behaviour of the teachers themselves. In the United Kingdom, for example, a number of initiatives are being taken to re-train head teachers and other key personnel to assume their new roles in comprehensive schools as part of a new and more general research effort to recast the role of teachers in innovational situations.

These considerations point to the need to re-conceptualise the purpose of teacher training and its content. Not only must the teacher be specifically trained to play his role within the educating process as it is newly conceived, but he must be open to new concepts of this process as they develop and must, furthermore, be able to engage in the related practical planning of change in school procedures and behaviours.

A Structuring of Major Issues in the Organisation of the Planning Process: Toward Country Profiles

These country experiences suggest a structure of functional issues with respect to the operation and organisation of the planning process which might form a convenient basis for making country "profiles" for this field:

1. The status of central policy planning and its support of and relationship to
2. Local and operational level planning. The status of various aspects of such planning, such as:
   - programme planning, for various types and levels of education;
   - geographical planning, regions, towns;
   - special project planning for innovation, experimental and problem school projects and experimental districts.
3. The control and role of research within the planning and the innovative process: sources of research policy; organisational location; content emphasis; the planning function for research programmes; the planned expansion of resources for research; the relative openness to initiatives taken by local institutions; the communication system for research and development.
4. The degree of integration between planning and development activities: particularly innovational development, whose status in terms of new general policy should be tested by planning investigation and by early reflection in new directions for planning.
5. The degree and direction of initiatives for planning within the operational and institutional units of the educational system and the level, quality and direction

of participation of constituent groups in the planning process, particularly students, teachers, parents and the community.

6. The depth of recurrent descriptive data designed to characterize the operation of the educational system and to assess its development in terms of indicators related to the social aims of education.

3. THE CONTENT OF COUNTRY PLANNING PROGRAMMES

In general the OECD country programmes in educational planning increasingly deal with factors related to the profound and long-term reform of their educational systems. The following account reflects specific aspects of this situation.

New Age Groups in the Educational System

Responsibility for educating new age groups is seen as a central development affecting the entire structure and character of future educational systems. For example, the Swedish and United Kingdom representatives emphasized the importance of planning studies for pre-school education. The subject of pre-school education has become a major issue in many countries (Germany, France, United States, Japan, Sweden and the United Kingdom). The question raised for consideration in the future structure of educational systems is how much attention must be given to the notion that the age between 0 and 5 offers the most efficient opportunity to educate the cognitive, social and cultural capacities of people?

Sweden emphasized that education beyond school ages - adult, "recurrent" education - together with pre-school education, comprised the two most important educational planning problems in that country. Other interventions, such as those from Norway and Italy, supported the idea that comprehensive planning for education now involves seeing education as a system which must provide full service to an age-range much wider than that covered by the traditional school years. In Norway future educational policy is being seriously discussed on the basis of a re-distribution of the total number of years of education available to all citizens as their right, at any time in their lives rather than only during their childhood and youth. The planning implications of this proposal have been developed in some detail in one contribution to this book.(See K. Eide, "Perspective Analysis for Education in 1990, Norway".)

Higher Education Issues

Another shift in emphasis involved a more direct interest in the character and operation of higher education. Earlier the issue was defined as a battle to broaden the social privilege to attend higher, particularly academic, education. This issue has been clearly linked to the question of the structure of the secondary schools, the character of which was seen as the key to student careers of various social groups. By and large, opinion and planning have concentrated on structural reform. However, this issue is now overtaken by a very fundamental questioning of the value of higher education in the first place, at least in its prevalent forms. Planning which, in its mature form, should anticipate crises well ahead, in this instance has little choice but to react to crisis. (In the heightened excitement, it has been suggested, the new energy may be used to "catch up" and get ahead in the planning game).

In spite of, or perhaps because of, the fundamental nature of these questions, the responses of country planning authorities typically involved efforts to replan various structural aspects of higher education, without dealing with the difficult dynamics of its functioning, either internally or in relationship to the rest of society. This meant that they report concern for:

- Quantitative analyses of higher education performance and required expansion. The need for and location of new resources.
- Structural re-organisation modifications of higher education: expansion of "non-university" higher education; relationship among various types of higher education, articulation with earlier levels of education.
- The organisation of the planning function for higher education. How shall it relate the government with the institutions, within and among themselves, and with the public?

- The student role in managerial control of universities. It is interesting to note how two reports, which attempted to lay down the structure for exploratory development, showed contrasting parameters:
  "... experiment ... governed according to... four different models. In model 1 a board with equal representation of teachers and students and representatives of technical and administrative staff has a right to decide on matters concerning content and organisation of education . . . In model 4, finally, the board is competent to decide upon all kinds of issues." (Sweden)
  "Taking into account the special status of students in campuses, however, students must be barred from participating in organs which are *de facto* final decision-making organs of universities." (Japan)

Increasing Substantive Depth with Respect to Other Educational Issues

Apart from these major concerns expressed by many countries, important topics, or unique approaches to them, were reported, often by single countries. When brought together, these showed how the "leading edges" of their planning programmes tend toward greater substantive depth with respect to financing and cost calculations, the relationship of planning to pedagogical reform, the relationship of education to rapidly changing societies, and the values and aims underlying policy plans for education. A summary list follows:

- Financial strategies for educational development. Examples: the deliberate policy of increasing aid to individuals (students, parents) at the expense of aid to institutions. The proposal to create an education "market" (United States).
- Cost models for educational institutions and systems defined in increasingly significant *pedagogical* terms: generally, for all school levels (Norway) and particularly for higher education (Turkey).
- Projected adaptations from the study of human development: the re-planning of the educational process and structure based on R and D studies based on this field (Japan).

- Planning implications of pedagogical reform: Examples: (a) higher education: "Working parties ... to determine the short, medium and long term effects of the pedagogic policy decisions adopted..." (France). (b) teacher education and research: the well-advanced plans for a unique university devoted to the sciences of education and teacher training (Austria).
- Qualitative manpower requirements: research on the crucial qualities required of the economic manpower (Norway).
- The total cultural experience as the subject of educational development planning: the recognition that an increasing proportion of life educational experience is and can be obtained outside the formal school structure (T.V., cinema, travel frequency, etc.) (Norway).
- The development of new institutional arrangements to bring outside groups into full participation in policy-making and management of the universities (France).
- Structure of proposed values stated as planning objectives and related to specific educational development measures. (Sweden, in stating the rationale and subsequent measures of the 1968 Comprehensive School Act. The question raised: how well-documented are the implied relationships?).

Future Perspectives for Programme Content

The participants generally acknowledged that the direction of progress in these planning programmes warranted a broader perspective for future work. Such a perspective would reflect their agreement that planning for education requires an understanding of the function of education as a part of today's great social and cultural transformations. (Prof. Thomas Green) This would involve significantly deeper social analyses and a consideration of alternative educational systems and processes. Only on this basis could the mutual impact between education and the economy be ultimately and realistically assessed. Such a perspective would affect at least the following areas.

- Higher education planning study based on the expectation of a general re-ordering of the educational process provided for the young adult age group. This focus would investigate and test various hypotheses implied in the many existing experiments and proposals for alternative forms of higher education. An important basis of this testing could be the profound changes in the populations involved and changes in the structures of the social-economy.
- The students: Planning based on a renewed recognition that the students are the central concern of education. Intensified investigation of the upper secondary and higher education student age group is currently needed. Again most planning work so far treats the student as one of the many elements in a numerical and structural re-organisation of the upper levels of education. For example, new planning efforts would have to appreciate deeply the great increase in the young people's biological maturity, in their worldly information base and social experience, in their alienation from adult institutions and in their critical mass as student groups and how these phenomena are connected to the world of education.
- The teacher: alternative planning models based on investigation of the social, psychological and economic characteristics of teachers. The appearance of teacher militancy; the need to re-define the teacher's role in management and policy affairs and in the learning-teaching process.

There was general acceptance of Dr. Gordon Pask's summary of a possible "model" for teacher training based on the notion of the teacher as an expert manager of the learning process:

- training with respect to the learning process and the nature of human development;
- training in the assembly of subject matter;
- training in "man management", i.e. in the allocation of human beings among functions and tasks;
- training in resource allocation.

- Alternative pedagogical models. Planning based on investigations into the consequence of possible alternative models of the pedagogical process projected into the future. Examples:
  Micro-models: classroom groups, schools, school clusters.

  Macro-models: a "life-long education" process model; models assuming no barrier between child education and continuing adult education or between community, work and school organisations.

- Alternative structural models based on the re-definition of the basic roles of educational institutions: for all educational levels, but particularly necessary for upper secondary and higher education. The approach here would be to study the implications for educational institutions of (1) the emerging new structures of the society and of (2) the need to influence choices in the creation of these future structures.

4. THE DEVELOPMENT OF LONG-TERM PLANNING AND THE PLANNING PROCESS

It is very apparent that these developments in country programmes for educational planning can take place only in conjunction with an increase in the time span over which the future of education is considered. As since 1963, these programmes have increasingly attempted to base calculations of future quantitative resource needs on a more substantive understanding of education, they have also pushed their time perspective into the future. However, such developments are, of course, never simple extensions of lines farther along on a graph. They involve parallel changes in the forms and procedures of planning study. Therefore, from these country experiences, it is possible to recognize a number of important facets in their planning programmes which, in concert with the extension toward long-term planning, tend to add the refinement and depth necessary to make such planning more meaningful.

Planning and plan-making can move toward increasingly sophisticated stages in function, social focus or viewpoint, value explicitness, macro-micro characteristics, and people's involvement. The downward direction in each of the appended lists describing stages under these headings (Chart) represents the general directions which are called for in conjunction with increasing time perspective - from short to long-term educational planning.

From Short to Long-Term Planning: Parallel Developments in the Planning Process

Function of planning

Quantity and deployment of resources.
Structural change.
Institutional change.
Social and behavioural change in educational activity.
Relationship of social and behavioural change to quantitative needs in education.

Social Focus of planning

Schools as isolated, as the seat of education.
Schools and the community.
Educational activity outside of schools.
Total educational experience offered in society.

Value explicitness of planning

Inexplicit to more explicit statement of underlying values.
Inexplicit to more explicit functional connection of values to plans and the measures they propose.

"Macro" - "Micro" dimensions in plan-making

General plans inherently superficial in their educational content.
Strategic involvement in reform and development measures which may not always "add up" to a "comprehensive" plan.

People's Involvement in planning

Central educational planning unit, group or agency.
Central operating officers of the educational system.
Local educational authorities.

Institutions and organisations outside of the
educational system.
The public directly related to the schools.
The public at large.

As this represents the general development of the OECD country programmes for educational planning, it provides background and motive force for the following discussions of long-term perspective in the planning of education.

II

NORWAY: PERSPECTIVE ANALYSIS FOR EDUCATION IN 1990

by

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This document reflects an attempt by the Planning Department of the Norwegian Ministry of Education to analyse some longer term perspectives of educational development, based primarily on Norwegian conditions, but with a view to more general developments in this field.

The problem facing planners in such tasks concerns the breakdown of most of the usual, trend prolongation techniques. We, for example, used certain trends as a starting point, then proceeded to discuss the factors likely to cause changes in those trends, or to identify the trend characteristics which would require a deliberate effort to prevent them from occurring. The danger involved in such a procedure is the lack of imagination on the part of the human element. Even when dealing with a traditionally rigid system such as education, our ability to foresee new developments, and relate them to present trends or tendencies, seriously limits the value of such exercises.

More interesting, we think, would have been an analysis of a number of widely deviating positions for the educational system as a whole, for example in 1990, and a discussion of the practical implications of policies for teaching, or possibly avoiding, such positions. Here too, however, our lack of knowledge about factual relationships, and failure to conceive all the relevant new possibilities, would seriously have hampered such an analysis. In this particular case, however, the decisive reason was simply the deadline set for our analysis by the Ministry of Finance, whose broader planning activities our study was to serve.

We hope, at least, to have avoided one of the pitfalls of educational planning; the presentation of definite future positions which tend either to be accepted as inevitable or, even worse, as a definite target to be achieved by all means. "Plan implementation" carried by political prestige should rightly be abhorred by all planners. While planners try to arrive at some sort of optimum plan, implementation in this sense rightly deserves the characteristic "optimummification", even if this word has not yet been adopted by the English language.

We have tried to undermine some of the more traditional conceptions of educational policy regarding actual costs to society, productivity etc., and to bring to the attention of those concerned a number of strategic choices, requiring decisions today and tomorrow, not twenty years ahead. Finally, though mainly implicit, we have tried to demonstrate the tremendous need for more knowledge about the essential factors in education and their interrelationships. Today most attempts to make educational policy more rational are doomed to failure due to our basic ignorance in this field.

To pretend that we know makes things worse. There is no easy way of avoiding substantial research and development which, to be effective, must accept the fact that there is little possibility for education to select nice neat submodels for research with a reasonable degree of autonomy. The whole complexity of interdependence of input and output factors must be included, even if this means the violation of some of the traditional rules of scientific behaviour.

We may then be able to make a much more thorough analysis of long-term perspectives providing a much better chance of producing insights of real help to educational policy.

I. INTRODUCTION

Aims of the Paper

The aim of this paper is to analyse the long-term need for resources in education, and in particular for the year 1990. The data used are based on Norwegian conditions, but the general analysis should have some relevance beyond this specific national context.

No attempt is made to forecast the most likely future developments in the educational sector; on the contrary, one purpose of the paper is to show how decisively long-term developments depend upon political decisions still to be taken. An attempt is made to identify what may be termed strategic choices in educational policy in the years ahead, and also the consequences indicated of various alternative policies.

Procedure

We shall proceed by defining educational activities in a way compatible with our purposes, and then discuss the resources needed and their relative importance today. The more basic factors behind changes in the need for such resources and their likely future developments will be analysed. The more important areas of priority choice will then be suggested.

A simplified model is given in the Annex to illustrate the verbal analysis specifying the main factors dealt with in the analysis and relating them to each other. When the values of variables in the model have been given, values have been chosen which appear to be within the sphere of reality. Beyond this, however, no forecasting significance should be attached to the figures, as they depend basically upon policy decisions not yet taken.

II. THE SCOPE OF EDUCATIONAL ACTIVITIES

Distribution of Educational Functions

Although a considerable number of educational activities take place outside the formal system of education, educational planning usually relates only to education for which public authorities are heavily involved, and particularly to the formal educational system. This may be appropriate in a short-term perspective, but educational history shows a continuous shift in the distribution of educational functions between the formal educational system, the family, working life and leisure time. There are strong reasons to believe that this functional distribution will continue to change in the future, and a long-term analysis must necessarily take this into account. This is particularly so in as much as substantial societal resources go to educational activities with little or no public responsibility or support.

Definition of Educational Activities

As "educational activities" we shall first include all activities within the formal school system; secondly, those connected with work, whether in the form of organised education within the enterprises, or unorganised individual activities as part of the job; thirdly, adult education as a spare time activity (including both organised education and individual unorganised educational activities).

Family Education

An account of educational activities is not complete which does not include those undertaken by children outside school, and particularly in the family. In the past, there has been a considerable transfer of educational functions from the family to the school, partly due to fundamental changes in family life caused by industrialisation and urbanisation. This may also occur in the future, particularly for children under school age. A major change in the present distribution of educational functions for these children seems quite likely in the long-term.

For practical reasons, family education has largely been excluded from the following analysis. This form of educational activity seems most remote from direct public engagements, and practically no data are available. However, as in all likelihood this form of education constitutes an important sector of the total educational activities in society, the exclusion introduces in the following analysis a bias which should be kept in mind.

A "definition" of educational activities as broad as this has many weaknesses. It is very vague in terms of distinguishing education from other activities in society. For many purposes a more narrow definition, i.e. based on the criterion of educational intention, would be preferable. For our purpose, however, we consider that a broad definition including as far as possible all activities with educational effect seems most appropriate.

III. RESOURCES IN EDUCATION

1. DIFFERENT TYPES OF RESOURCES

Lack of Data on Resource Input

A major problem arising from the definition of educational activities used here, is that we know very little about the input of different types of resources. Our knowledge is mostly restricted to the formal school system.

Pupils' Time, the Essential Resource

However, we do know that the most important resource in all forms of education is the time spent by pupils(1) to be educated. For the formal school system only, Norwegian data show 700,000 pupils or 18 per cent of the country's population. Even if we apply a conventional economic measure, assigning no economic value to time spent by children under 15 years of age, income foregone by the 225,000 pupils of working age is estimated at between Cr.4 and 5 billion. This is more than the total expenditure on all other educational resources in the school system.

Children's Time has a Value

It is obviously unreasonable to assume that time spent by children under 15 years of age has no economic value. The educational level of the 15 year olds is obviously very important both in relation to societal aims in general, and more specifically from an economic point of view. Comparative studies show great variations in knowledge and attitudes between the youth of various countries, and also between the different groups of youth inside one country, in both cases depending greatly upon the kind of education they have had. The sharp distinction between the economic value of time spent by children under 15 years and those of 15 years and over is therefore highly artificial, specifically in relation to the allocation of resources within the educational sector.

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(1) The term "pupil" is used here as a common term for everybody who is being educated, including students and people engaged in full-time work.

General Value of Pupils' Time

From the point of view of more general policy aims, alternatives for time-spending by children under working age are essential. The time spent by children in school is not only a considerable part of the life of an individual, but is also in many ways decisive for his future. In all likelihood, the way a child spends his time is more important than the way an individual spends his time at any other period of similar duration in his later life, including the most productive working periods.

Teachers' Time

Of the other resources entering the educational process, the input of teachers' time is usually counted as the most important. Within the formal school system, about two-thirds of current costs are spent on teachers' salaries. The proportion is usually somewhat lower at the highest levels of education.

Capital

The capital input in the educational sector, mainly in terms of buildings and durable equipment, constitutes a relatively modest proportion of the total resource input. Even excluding the value of pupils' time, capital costs have in later years amounted only to one-sixth of the costs of organised education in Norway. Compared with other nations, this is a relatively high proportion, and the same is true for Norway in a historical perspective.

Other Current Expenditures

Salaries other than those of teachers constitute nearly half the rest of current expenditure in formal education, the balance consisting of a wide range of goods and services.

Distribution of Costs

For the formal system of education in Norway, the total costs are distributed among various types of resources as follows:

	Percentages
Value of pupils' time	50
Teachers' salaries	25 - 30
Other salaries	5 - 6
Purchase of goods and services	6 - 8
Capital investments	8 10
Total	100

This, of course, is not a very exact cost account but is meant simply as an illustration of the order of magnitude, a major source of error being that no value has been assigned to time spent by pupils under 15 years of age.

This average distribution of costs does not correspond to cost distribution at the different levels of the school system. Under our assumption, teacher costs will count very heavily at primary and lower secondary levels (65 per cent), while pupils' time is the dominant cost factor in all education at higher levels. At the university level, teachers' salaries constitute hardly more than 20 per cent of total costs.

Cost Distribution for Work and Spare Time Education

The data presented above on cost distribution relate only to the formal educational system. In other types of educational activity the cost structure is very different. In both work and spare-time education, pupils' time is the predominant cost factor. Teacher costs are very modest, since education is provided mainly with the aid of books and other instructional material such as radio and television. Equipment expenditure is likely to be greater than teachers' salaries, while other capital costs are negligible.

2. THE NEED FOR RESOURCES IN DIFFERENT FORMS OF EDUCATION

The relative importance of resources spent in the various forms of educational activities is extremely difficult to estimate. We know very little about the scope of educational activities whether in work or spare time. The following example may, however, throw some light on the relative magnitudes of resource input.

Example of Illustration

Let us assume that a human being spends eight hours a day on sleep. Time spent on dressing, eating, travel to work etc., may be estimated at four hours a day, leaving twelve hours for other activities. Of these, we assume that six hours are spent working(1). Six hours daily are thus left for spare time activities; in the long-run this may prove an underestimation.

Let us then assume a situation in which each individual spends one-half of his six spare time hours on education. By education we mean here all activities having the effect sought in organised education, and achieved by reading, watching television or radio, listening to lectures, taking part in correspondence courses, discussions, etc.

Let us also assume that half-an-hour out of the six hours of daily work is spent on keeping professional skills up to date and obtaining further qualifications. Part of this time will be spent on organised educational activities within the firm, but in the main it will undoubtedly consist of individual learning through reading, contacts with colleagues etc.

How Realistic are the Assumptions?

The realism of these assumptions is, of course, open to discussion. Educational activities in spare time may already correspond to the situation we have assumed. Our definition of educational activities at least does not make the assumption too Utopian. We also know that the assumption made concerning work education has already been surpassed in many professions, although mainly those requiring higher education. However, educational needs will also increase at the lower professional levels as increasing pressure for adaptation to new work functions makes this necessary. Even if our assumptions have overestimated the times which are valid at present, in the not too distant future they will probably be fairly realistic.

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(1) Six hours a day, seven days a week, correspond to the present normal working hours in Norway.

Resource Distribution among Forms of Education

If for a moment we accept these assumptions, the total resource input into educational activities would be as follows: half of all resources for educational activities goes into the formal school system, one third into spare-time education, and one-sixth into education combined with work.

If, instead of half-an-hour each day being devoted to work and to spare-time education respectively, we assume one hour for each, the proportions change to 45 per cent of resources devoted to spare-time activities, 35 per cent to formal education and 20 per cent to work-time education.

The exclusion of family education from our example should be borne in mind at this stage. If we consider only the manpower resources that would be potentially freed for work outside the family if formal education were expanded for those under school age it is clear that they would be considerable.

Total Resource Input

This kind of reasoning leads to estimates of the total resource input into educational activities of the order of Cr.15-20 billion in a small country such as Norway, or 4 to 5 times more than the total public expenditure on education. Such sums do not, of course, fit into the frame of national accounting, as the major part of these resources are not transacted in a market or spent by public authorities. Yet, we are dealing with real resources devoted to educational activities in competition with other alternative applications, some of which are economic in character. If spent in ways registered in national accounting systems, they would have been reflected in the national product in the same way as other resources. Thus, from the point of view of the allocation of the total productive resources in society, we are dealing with the alternative allocation of real resources for different purposes, and the resource input must be judged in this perspective.

Biased Resource Allocation within Education

This is extremely important in connection with the allocation of resources within the educational sector. It seems very likely that traditional ways of thinking have prevented an economically optimum allocation of resources in this sector. Nor is the distribution of responsibilities among public authorities, enterprises and individuals such that the optimum distribution of functions and resources is ensured. It is therefore essential that such broader economic considerations be used as a basis for decisions taken by those responsible within the educational sector.

General Welfare Arguments

Viewed in the light of general welfare considerations, other factors also enter the picture. As mentioned above, the use of children's time is essential from this point of view, irrespective of its possible economic value. On the other hand, it is quite possible that spare-time education for example, may be felt by the individual to represent a smaller cost than the economic value of the time spent.

More such examples could be mentioned on the cost side, but the most important difference between the more general welfare type of reasoning and the purely economic point of view may concern the evaluation of the results of education. Here we are faced with a purely normative weighting of the various components of a total objective function for educational policy.

IV. FACTORS INFLUENCING THE NEED FOR EDUCATIONAL RESOURCES

"Autonomous" Developments

The longer the time perspective for an analysis, the more difficult it is to find factors which can be regarded as "autonomous". In most fields, developments depend largely on policy decisions, and the range of choice by such decisions increases with prolonged time perspective. This limitation must be kept in mind when we subsequently discuss the long-term trends of some of the main factors influencing the need for resources in education.

1. THE MAIN FACTORS

Demand for Education and for Educated Manpower

The need for resources in education is primarily determined by the demand for education and for educated manpower. These two factors are sometimes confronted with each other as supply and demand in one market. Such an analogy is, however, very misleading.

The demand for education will, of course, be influenced by the increased income possibilities provided by improved education. Clearly, however, the direct implications of education for the individual's welfare also plays an important role in determining demand. Such implications may be related to greater freedom of choice regarding future career, to social prestige, or to other subjective values connected with further education.

There is a certain parallel here to the situation in the labour market, where working conditions apart from salaries influence the supply of labour. Even here, the resulting wage differentials do not reflect the differences in marginal productivity from the economic point of view, as they do not include the part of the "price" consisting of welfare gains or losses connected with the work.

The demand for educated manpower may be reviewed as a mixture of demand for goods actually produced by education and demand for personal qualifications, assumed to be identified through the selection mechanism in the educational system. We do not know to what extent higher wages for better educational qualifications are actually a premium for being among those selected through education. Consequently the demand for manpower with different educational qualifications does not necessarily reflect the economic value of such qualifications.

Suboptimum Balance Between Supply and Demand

If the educational system is regarded as a market in which supply of and demand for different categories of educated manpower meet, there would be no reason to expect an equilibrium which represents optimum educational activities from the economic point of view. More general welfare considerations make the relationship between optimum educational effort and the actual equilibrium between supply and demand even more arbitrary.

Both Supply and Demand Dependent upon Policy Decisions

The demand for education cannot be regarded as a fully autonomous factor in relation to policies pursued by educational authorities. The authorities can directly influence the "price" for education by subsidising a certain proportion of the costs. "Free" education in terms of public financing of institutional costs in education implies a major subsidy of this kind. On the other hand, the main bulk of educational costs for pupils of working age stems from the income foregone. This means that most of the costs are still carried directly by the individual or his family.

Furthermore, public authorities can make education compulsory, and can influence demand through the geographical distribution of educational institutions. The content and methods of education will appear to be more or less relevant for different groups of the population. There are examples of many types of education which large parts of the population do not consider relevant in relation to their needs. Changes in content and method may therefore influence demand decisively, and represent an important policy instrument for educational authorities.

In more general terms, the demand for education also depends on a society's economic development and particularly on its income distribution. The structure of population localisation, the degree of social mobility and a number of other factors dependent on governmental policy are also important.

Correspondingly, the demand for educated manpower also depends on government policy. The relevance of education, from the point of view of the economy, plays a central role. In addition, the "price" of educated manpower is influenced by the general direction of government income policy. In more general terms, the development of the industrial and economic structure is essential in the long run.

Productivity in Education

The need for resources in education does not depend only on the demand for education and educated manpower. Productivity in the educational sector is another important factor. The concept of productivity in education, however, is often used without a clear meaning, possibly due to lack of clarity in the definition of educational objectives, and to mistaken ideas about the importance of the different input factors in education.

Utilisation of Pupils' Time

As shown above, pupils' time is usually the dominant cost factor in educational activities. The main question of productivity in education is therefore to ensure the best possible use of this dominant factor, i.e. through a larger input of other resources. The present situation in our educational system is likely to represent a far from optimum combination of input factors because of the tendency to underestimate the value of pupils' time as a resource. This, in turn, is due to the fact that the cost of this factor is only to a small extent reflected in public budgets, and is consequently disregarded by educational authorities.

Substitution among Different Resources

Irrespective of how educational objectives are defined, wide possibilities exist for substitution among the different types of resources devoted to education. As the "technology" of education progresses a considerable degree of choice becomes apparent between, for example, increased output of pupils' time and increased input of other resources. This is perhaps the most important choice facing educational policy makers in the years ahead.

In the following we shall discuss in turn the long-term tendencies in the three main factors influencing the need for educational resources:

the demand for education;
the demand for educated manpower;
productivity in education.

2. TRENDS IN THE DEMAND FOR EDUCATION

Previous Developments

The development of the demand for education is indicated by the following figures showing the average number of school years of newcomers to the labour market in Norway.

1930	1940	1950	1960	1970
7 years	8 years	9 years	10 years	11.5 years

This time series does not take into account the fact that several types of education have been restricted, and that admission is more limited today than in 1930 or 1940. With the same degree of access to education the figures for the later years would have been somewhat higher.

Productivity Increases

A more important source of error is the measuring of educational activities in terms of years of education. During this period there has been a substantial increase in the relative input of factors other than pupils' time. From 1938 to 1968, expenditure per pupil in real terms increased by a factor of 3 in primary education, and 2.5 in secondary education. Part of this increase is due to increased real wages for teachers, and does not necessarily reflect a corresponding increase in the productivity of teacher input. There can be no doubt, however, that "educational standards", measured by the input of real resources per pupil, have increased significantly during this period. This is confirmed by a comparison between the requirements of pupils 30 years ago and those of the same type today.

This means that the actual increase in educational effort in the organised school system has been considerably bigger than that reflected in the time series. Part of this increase has taken the form of improved performance per pupil year, while an increasing part of the demand for education has not found its expression in actual educational activities.

Trend Prolongation

An extrapolation of the trend shown above to 1990, indicates an average of 14 years in organised education for newcomers to the labour market, and presupposes a continued increase in productivity, and growing difficulty of access to education.

The accuracy of such assumptions depends to a large extent on policy decisions in the years ahead, but it seems unlikely that applicants for admission to education will meet with increasing difficulty in future. In Norway, the tendency during the past 5-6 years has in fact been the opposite, as pressure from the high post-war birth rate has fallen. As early as 1970 the capacity of the organised school system is expected to be sufficient to satisfy all demand at secondary level. In the long run this factor should, therefore, indicate an upward shift in the trend for actual school attendance.

Continued Productivity Increase

Although a continued productivity increase in the years to come depends primarily upon educational policy decisions, three relatively autonomous factors in this context should also be mentioned.

First, the "technological" developments within the education sector may show an exponential trend due to the extremely active research and development efforts undertaken by several countries. This development might well lead to an upward shift in educational productivity trends.

Secondly, the pressure for technological changes in education is partly due to the continual changes in the relative costs of personnel resources, paid for by almost automatically increasing real wages, and in other resources whose real costs increase more slowly. Non-wage costs become relatively less expensive, a development which may have considerable implications in the long run.

Thirdly, there may be a tendency, both among pupils and others, to react against increased educational requirements in the form of extended formal education. "Drop out" may become increasingly embarrassing, and the notion of most young people seeing nothing of society other than the family and the school before they are well into their twenties may raise fundamental objections.

Numerous factors thus point towards stronger efforts to increase the productivity of educational activities. This might justify the assumption that the decisions of political authorities will have to accept the need for such policies.

The Marginal Productivity of Education

An argument against extrapolating into the far future the demand for education trend may be based on the assumption that the value of additional education diminishes as the level of education rises. Such an argument becomes especially significant if it is assumed that the intellectual potential of the individual sets definite limits to the usefulness of education.

Adaptability of Educational Systems

Arguments are drawn mainly from experience with static school systems. History shows, however, that educational systems have considerable adaptability concerning new tasks, and that limits to the amount of education an individual can use are very difficult to define. A comparison with a number of other countries, and particularly the more advanced areas within those countries, indicates a wide scope for the future profitable expansion of education for a country such as Norway. The extrapolation of previous trends up to 1990 hardly represents a limit of what might be possible, even with the educational technology available today. With further technological improvements, "profitable" education for the individual may be pushed much further in the years ahead.

Social Mobility

The increased demand for education is related to increased requirements within the economy and society as a whole. To many people, education is essential as a basis for better self realisation, and is conceived by large groups of the population as the prime instrument of social mobility.

A series of studies in several countries all conclude that the educational background of the parents is the factor which contributes most to "explaining" the demand for education. This may be an important reason why such demand appears to develop along an exponential curve. Similar results have been obtained in Norway. If future "gymnasium" enrolments are forecast on the basis of the future development of parents' education, participation in this kind of school will increase much more drastically than indicated by previous trends. The changes in the school structure at lower secondary level also seem to indicate an upward shift in the demand for education at the next level.

Education Abroad

Part of the demand for education by Norwegians is directed towards education abroad. In terms of young people studying abroad, the extent of such educational activities is, however, very limited, less than 1 per cent of the full-time pupils in organised education being enrolled outside Norway.

Norwegians obtain a certain amount of informal education through work assignments abroad by means of fellowships, consultancies, peace corps service, temporary emigration, etc. Such activities add significantly to the educational experience of the population.

The former of these two types of education abroad can scarcely be expected to increase in scope. The more informal types of educational experience abroad, on the other hand, may increase significantly due to growing mobility in the international labour market.

Educational Demand from Abroad

There is a certain amount of demand for education in Norway from abroad. This is, however, a very limited factor in the total demand today. It seems unlikely, partly for linguistic reasons, that this situation will change basically in the future. Export of educational resources to other countries, especially in connection with development aid, may increase considerably however.

By and large, educational demand in Norway will also in the future have to be met by our own resources. On the other hand, even a strong relative increase in the demand from abroad

Education and Automation

Such assumptions contain a considerable amount of uncertainty, especially in the long run. At an early stage in the development of automation, a reduction seemed possible in the educational requirements of large groups of workers concerned mainly with control and supervisory functions. However, it now seems more likely that further technical developments imply the automation of such routine functions, with a consequent rapid increase in educational requirements for the majority of workers in secondary industries.

Adjusting Education to New Needs in the Services

Somewhat parallel tendencies can be foreseen for the service industries. The occupational functions requiring personal contact between the professional and his client seems to be those least suitable for automation and which will expand rapidly in terms of manpower. Such functions also show an exceptionally rapid upward shift in educational requirements (e.g. social work, counselling, customer advice etc.). This raises the relatively high educational level which is already characteristic of service functions today.

Continued Increase in Educational Requirements

It is clearly impossible to make a reliable forecast of qualified manpower needs in 1990. Today, all one can observe is that short-run tendencies show increasing educational requirements on the part of the labour force, and that no obvious reasons can be seen for a change in this development in the longer run. Consequently, there is no a priori reason to believe that the prolongation of past trends in the demand for education will lead to an excess production of educated manpower over educational requirements in the economy.

Qualitative Adaptation Most Important

An essential question in this context concerns the relevance of education to occupational tasks. Probably, developments in this respect are far more important than "surplus" or "shortage" of specific categories of manpower. This is the main reason why so many attempts at long-term manpower forecasting have very little meaning. Educational relevance is also essential to productivity in education, but is often overlooked when resource input per pupil is used as a measure of educational standard.

The formal educational system is a complex social mechanism not easily adaptable to changes in educational requirements. Purely quantitative changes do not create insurmountable difficulties, and structural changes can be implemented given sufficient time. "Technological" changes appear far more difficult to implement on a broad scale, and even greater complications arise when new ideas about "relevant" education are introduced. This experience is not unique for Norway, but seems to be a general feature of most educational systems.

Increased Adaptation Ability

With accelerating changes in the economy and in society in general, such rigidities in the educational system represent a grave problem. There is a very real danger that education will lag increasingly behind in its relevance to the needs of the individual, both in and outside working life. Increased efforts are needed, therefore, to strengthen such factors as may improve educational systems' ability to adapt.

The achievement of a higher level of research and development effort in education is very important here. In terms of cost, however, the dissemination of new insights and new value orientation is likely to demand far greater resources. As an example, an extensive and regular retraining of teachers will be needed to a greater extent than that required by most other professions. Major systematic efforts in the production and frequent revision of educational aids will be necessary, and will require resources far beyond those at present available.

The expected demand for educated manpower thus stresses the need for a more rapid increase in educational productivity than that reflected in recent trends. As mentioned before, possibilities exist for a productivity increase through more "pupil intensive" educational activities.

International Mobility

International mobility may also affect manpower requirements in the long run. Norway ought perhaps to be prepared for a certain net export of highly qualified manpower. This is already true today, and such emigration will probably increase in scope as a consequence of the general development towards greater international mobility of manpower.

To some extent, such developments will depend upon our own policy, not only as it affects wages and taxes but also as it affects our ability to promote an attractive social and cultural climate. Although our migration policy has a certain part to play, the most important factors will probably be beyond national control. Internationally, Norway is a fairly peripheral area, and can hardly avoid all the consequences of her geographical situation in the move towards increased international mobility.

4. THE DEMAND FOR EDUCATION IN WORK AND SPARE-TIME

Up to now we have concentrated on formal education prior to entry to the labour market. We shall go on to discuss some aspects of the development of education in work and spare time.

Work Education

In general, we find the same tendencies in work-time education as we have already noted in formal education. Demand for education will also be increased as a result of the competition to which adult workers will be subject from new entrants to the labour market with a far better basic education. The disparity in educational levels between the generations is gradually becoming substantial, and what might be termed "compensatory" education for adults would probably have reached considerable dimensions already today, had the supply of education offered been adequate.

Updating and Retraining

The need for professional updating and retraining is a direct result of technical and organisational changes in the economy. The rate of change is no doubt accelerating, thus requiring an increasing educational effort to facilitate the adaptation of the individual. Up to now, such educational effort has mostly concerned highly qualified manpower, and people in technically outdated occupations. In the future, they will apply to workers at all qualification levels, and perhaps specifically those with a weak educational background.

The need for retraining will also increasingly be felt among older workers who will often be particularly threatened by technological unemployment. If substantial unemployment, or pre-pensionning of older workers is to be avoided, educational updating and retraining will be necessary instruments.

The Relevance of Education

The value of work-education depends even more on its relevance than does education in the formal educational system. This makes it especially important to arrive at a financial and organisational structure which can ensure an appropriate division of educational functions between enterprises and schools. This requirement is not fully met in our present system, and changes here may signficantly influence the demand for work-education.

Spare-time Education

The same tendencies will prevail in spare-time education as in the formal educational system and an increasing need for "compensatory" education for adults will also be felt.

The development towards more spare time specifically affects spare-time education which appears to be developing more rapidly than formal education systems, a tendency which is likely to continue in the future.

Family Education

The importance of the part of family education in all educational activities may decline somewhat in the years ahead, at least relatively. An important factor in this context is a possible lowering of the school admission age. Strong social and economic arguments point in this direction. Pedagogical research has added arguments concerning the educational effectiveness of such measures.

Even if the importance of family education declines, other educational impulses outside the school and the family may become more important, especially through such mass media as newspapers, radio and television and youth organisations.

5. DISTRIBUTION OF TASKS AMONG THE DIFFERENT FORMS OF EDUCATION

As shown above, the demand for education and educated manpower is likely to increase substantially in terms of formal work and spare-time education. The relative distribution of educational tasks among these forms of educational activity, however, needs further comments.

Increasing Obsolescence of Knowledge

In this context a fundamental fact is the effect of the accelerating change in society on the value of knowledge acquired through education, in terms of its relevance to existing needs. The more rapid obsolescence of knowledge requires a major re-orientation of educational effort in relation to the life span of the individual, with more emphasis on educational inputs for adults.

Such a re-orientation, however, will be possible only through substantial changes in the organisation of educational effort, and in the system of educational financing. As such changes have hardly started, the present balance between formal education for adults is probably far from rational.

"Alienation" due to Lack of Educational Adaptation

It should be stressed at this point that the increased need for education at later stages in an individual's life does not arise only as a result of occupational changes; there is a real risk that the present developments in society as a whole increase the danger of social "alienation" because of the lack of educational adaptation. The feeling of having control over his life situation, and participation in decisions determining his own environment, are essential to the welfare of the individual. Without educational updating, many people today risk losing this feeling both as citizens and as members of a local milieu. Drop-outs and the doubtful advantages of a very late entry into the labour market give greater emphasis to education for adults. Even pedagogically, such education provides greater opportunities for specialisation in relation to the needs of the individual.

Re-orientation Towards Education for Adults

It seems a fairly safe conclusion that in the future there will be a clear re-orientation of educational activities towards education for adults in various forms, organised or unorganised. How far this re-orientation will go depends primarily on the willingness and ability of political authorities to initiate the necessary organisational changes.

The increased emphasis on education for adults is not, however, likely to be strong enough to prevent the formal school system from continuing to expand. A part of this expansion may take the form of a lower age for admission.

Education in and Outside Work

The relationship between education in and outside work will be influenced by the need to strengthen the general educational background of the labour force. A better general base will increase the occupational flexibility of the individual but may at the same time reduce the emphasis on specialised education to provide specific occupational skills.

This indicates somewhat contradictory tendencies for vocational education. Full-time education tends to take over more of the functions previously performed by more informal apprenticeship training, due to the need for a more general educational background. At the same time, enterprises tend to take over the more specialized training for specific occupational functions. This may be due to the difficulties of the formal educational system in keeping up with rapid changes in occupational functions.

There is no clear distinction between work time and spare-time education. The latter may, in fact, partly take the form of more or less compulsory, but usually unpaid, overtime. Enterprises may also possibly want to influence more strongly this form of economically relevant education. The reduction in working hours may, on the other hand, point in other directions.

Conditions for Work-Education

The total effect of these tendencies for the relative importance of work-education is difficult to foresee. Much will depend upon the conditions offered to those who want education. The situation of the adult pupil concerning the financing of education is completely different from that of one in the formal educational system. The adult pupil cannot deprive his family of income which is foregone due to education, nor can he accept the rate of consumption tolerated by young people at school, which is drastically lower than that of those of the same age who are working. At present we have no system for financing adult education which in any way meets the real needs. The usual system of fellowships and loans is quite inadequate in this context and paid leave from work is exceptional.

Irrational Consequences of the Present System of Financing

From an economic point of view, this difference in educational opportunity is extremely irrational. In terms of costs to society, full-time education for adults is not much more expensive than regular higher education. Today, however, the difference in the possibilities for financing causes very different situations in terms of demand.

Another aspect of the system of financing leading to irrational adaptation is that work-relevant education provided within the formal school system implies no financial obligations for the enterprise. Educational measures within the enterprise, on the other hand, will not normally be publicly subsidized. It thus becomes profitable for the enterprise to leave as many educational functions as possible to the school system, even if the latter cannot provide an adequate milieu for such functions.

Possibilities for Better Adaptation

Such built-in biases in the system of financing as those mentioned above, together with the underdeveloped supply of adequate education for adults, is at present the main cause of an irrational balance between the different forms of educational activity. This is equally true from the economic point of view as from one concerned with more general welfare objectives. Better adaptation might be achieved as follows:

> If the right to full pay during retraining were to become part of the working conditions in most occupations. Financial responsibility to become a contractual or legal obligation for the enterprises or, in the long run, more probably part of the general social security system. The latter would in fact represent a logical extension of the present system of unemployment insurance.
>
> If education intended mainly as preparation for occupation were to be financed by a specific tax on enterprises. Such a tax might also be used to finance education within enterprises satisfying specified requirements. An enterprise making large investments in education will thus get its cost covered, while those leaving educational tasks to the school system will contribute to their financing. Somewhat similar systems already operate in England and France.

If educational institutions at various levels were to be instructed, and given the necessary resources to develop an adequate supply of education for adults. This should not be in addition to their current educational activities, but a regular part of their overall functions. Each branch of study would have to be re-examined to arrive at a rational distribution of educational effort over the life span of the individual. As a consequence, contact between educational institutions and the society in which they exist would have to be considerably strengthened.

If such measures were implemented, work and spare-time education would be likely to grow much faster than education offered through the regular school system, thus providing a rational adaptation to existing needs.

Productivity in Education for Adults

As regards the productivity of work education, stronger involvement on the part of enterprises might strengthen its relevance. Similarly, if workers' organisations were to be engaged in spare-time education, the relevance of such activities would be more certain. In this field, however, future developments may be more doubtful.

Changes in Technology

Better utilisation of pupils' time may be envisaged in education for adults through changes in educational technology. Recent developments seem to point in particular to spare-time education as a promising field for increased productivity. The development of "distance education" in various forms, through correspondence courses, radio and television, and through production of general "packages" of self instructional material, seems to open up new possibilities. Various types of teaching machines may add to the chances for a definite break-through changing basically the relative productivity of spare-time education as compared to formal school education.

In the long run similar technological changes may also gain ground in work-education. It seems likely that educational activities will be increasingly accepted as a regular and important part of work performance, and that efforts towards rationalisation will be accepted as equally important for this work function as for others.

In this context, the low direct costs of education for adults is an advantage. A substantial increase in educational inputs other than pupils' time will not, therefore, lead to a decisive increase in total costs, while the potential productivity gains are considerable. Thus the possibilities of increased productivity in education appear to be at least as good in work and spare-time education as in the formal school system.

V. PRIORITY ASSESSMENTS

Objectives for Educational Policy

The question of educational objectives has not yet been considered in our analysis, the assumption being that the arguments put forward are valid, irrespective of the objectives education is supposed to serve, and of the relative weighting of such objectives.

The validity of this assumption may be doubtful and some comments should be made concerning the objectives of educational policy and their possible implications for the assessment of policy priorities.

1. EDUCATIONAL OBJECTIVES

Numerous attempts have been made in various countries to formulate educational objectives, the formulations clustering around the following types.

Educational performance in a particular country should be comparable to that in other countries. Such an objective can be meaningful only if strong complementarity exists between efforts in education and developments in the economy and other spheres of society. Such assumptions have formed the basis for several attempts to establish country "typologies" as a basis for advertising on educational policy, especially in developing countries.

Practical experience hardly justifies the assumption of such complementarity to an extent that would make educational typologies useful as a basis for policy advice. Yet international comparisons may be helpful in identifying deviating features in one's own system, features which at least may call for a special explanation. If no such explanation can be found, this may be taken as an indication of irrationality.

Education should aim at developing the personality of each individual, promoting self-realisation, creativity, and/or adaptation to a changing world. Educational objectives of this type are often presented as being non-controversial, in the sense that general consensus is supposed to exist on their implicit values. Closer analysis reveals, however, that such "quasi-objective" aims to become operational for educational policy, will have to be supplemented by genuine value judgements concerning the specific personality traits or aspects of creativity to be promoted, or by specific assumptions concerning the kind of society to which the individual should be trained to adapt. Conclusions for educational policy thus differ considerably according to the normative interpretations of such aims.

Education should promote economic growth. Objectives of this type depend on the interpretation of economic growth and on assumptions concerning the actual relationship between education and the economy. Our knowledge of these questions, however, is limited. There is considerable evidence that most of the methods applied to deduct educational requirements from economic growth targets are based on assumptions which make their value for actual policy making extremely doubtful.

The dependence of the demand for educated manpower on the qualitative aspects of education leaves us with the open question of what such demands may amount to in the future. Unless the future demand for educated manpower is based on simple conventions about specific types of education for specific jobs, such demands might as well be said to depend on the development of education as the other way around.

Each individual should be ensured equal right to education. Formulations of egalitarian aims of education differ substantially in content, depending on the extent to which the interpretation of such rights implies the compensation of various factors causing actual inequality in educational participation. Since education inevitably implies the transfer of cultural values, an extreme egalitarian position might deny education the right to impose on an individual any cultural values differing from those of his own background. Otherwise many individuals would be handicapped and discriminated against.

Education should select individuals for the different functions in society. The idea that education has an essential function in society as a selection mechanism is closely interwoven into most educational systems. Employers, and also institutions at higher educational level are supposedly informed by the educational system what to expect of potential candidates.

The necessity of such a function, however, is heavily debated and it seems, strangely enough, that teachers are often more partial to this function than those who should benefit from it. The ability of the school system adequately to perform such a selection function is also very debatable from the point of view of both the individual and the "users" of educational output.

Education should transfer to pupils specific cultural values. Such values may relate to traditional culture and/or religion, but may also be related to "democratic attitudes", "tolerance", "scientific attitudes", etc. Such values are often supposed to be "commonly held", though in many cases they simply reflect the values of culturally dominant minority groups within the society. In educational practice they also often appear to be contradictory, even when in the same list of objectives for a particular school system.

The ability of a school system to transfer values depends on a variety of factors, and in many cases the effect seems limited to the adoption of a number of rituals associated with certain values. There is reason to believe that the real internality of values through education requires basically different methods from those which spread value symbols through imitation.

2. INTERDEPENDENCY OF OBJECTIVES

The interdependence of these different objectives is as important as the normative weight attached to them. Being non-identical, they naturally always compete for resources. In addition to this, however, they may be complementary or alternative in a "technical" sense, in as much as the promoting of one objective may increase or decrease the degree of fulfilment of another.

Economic and egalitarian objectives in education now appear to be far more complementary than was previously believed. Only extreme egalitarian views, insisting upon the conservation of existing cultural differences in society seem to be in direct conflict with economic aims.

Egalitarian objectives, on the other hand, seem mainly alternative to conceptions of the educational system as primarily a selection mechanism. A high degree of selectiveness in the educational system seems incompatible with economic objectives.

Objectives concerning personality development may well be complementary to economic and egalitarian objectives depending, however, on the normative values implicit in the interpretation of "desirable" personality developments. Strong emphasis on selectiveness seems to have an alternative relationship to most interpretations of personality development objectives.

Transfer of values relates to other objectives in different ways, depending upon the values in question. However, when such values are transferred by means of authoritarian, directive methods, there may be a general alternative relationship between such objectives and economic, egalitarian and personality aims.

Interdependency of Education and other Policies

Most educational policy objectives are related to the general objectives of society, education being only one of the possible instruments of promoting such objectives. This interdependence between educational policy as an instrument and policies in other fields stresses the need for integration between policies in all these areas. A specific objectives-function for education, with normative weight on each sub-objective, is hardly meaningful unless the position of other factors serving the same aims is defined. Any "systems analysis approach" to educational policy overlooking such interdependency contradicts the basic principles of systems analysis itself.

"Local" Priority Assessments

A systematic analysis of ends and means in education is hardly undertaken as a research exercise, and far less as a basis for actual educational policies. Keeping in mind these complex relationships, we shall therefore now turn to some of the more usual areas for priority assessment in educational policy. In principle, such assessments represent a search for optimum solutions within minor sub-systems, a more or less incorrect assumption being that such systems have a reasonable amount of autonomy in relation to outside variables.

Quantitative and Qualitative Requirements

An essential priority problem in educational policy, already commented on above, is the balancing of quantity and quality. Any rational decision in this area is often hampered by the traditional superstitions implied in conventional quality criteria. Quality can be measured meaningfully only in relation to the objectives education is to serve. The frequently expressed fear of a "decline in educational quality" very often reflects resistance towards an actual change in educational objectives, or new insights in the ends/means relationships.

The importance of quality, properly defined, should not, however, be underestimated. An outstanding business man(1) illustrates this from the point of view of industry, in his statement of what is required of the school system:

(1) The school must create people with appetite for change;

(2) The school must create people with ability to understand their own surroundings;

(3) The school must create good citizens.

He summarizes his requirements in a call for originality, courage and flexibility, in contrast to conformity, timidity, and rigidity.

Such requirements correspond well to deductions based on non-economic objectives for education. If they are to be taken seriously, then education today is very far from its optimum performance. At least in most developed countries, its potential in terms of quality as compared to the present situation must be far more important than any possible deviation in terms of "shortages" or "surpluses".

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(1) Peter G. Petersen, Head of Bell Company, in Undervisningsteknologi, No. 9, 1967

Who Should Receive Education?

The development of the personality of each individual as an educational aim must take as its starting point the characteristics of each pupil. Serious acceptance of this aim leads to the conclusion that there is no *a priori* reason why some people need more education than others.

The apparent contradiction between such a conclusion and the economic objectives of education arises from the tendency to mistake the results of the educational selection process for the actual results of education itself. The "value added" through education is not, however, necessarily correlated to other specific factors, such as intelligence. We know that for particularly weak pupils, education has often made the difference between a life of dependence on others and one as an active member of society. In Norway this is thought to justify in terms of both welfare and economics, an expenditure per pupil ten times higher in special education than in the regular school. There is *a priori* no reason why expenditure for pupils above the special school level but still below average, should not be at least comparable to that for highly intelligent pupils.

One reason for the confusion in this field is the weight attached in our present school system to the contribution of the intelligence factor to most educational objectives, and not least its contribution to the economy. There is, in fact, considerable evidence to the effect that other aspects of the human personality may often be at least as important.

One particular aspect of future developments, both in the economy and elsewhere, is the increasing tendency to create "losers" - people who are not up to the level of the complexity of the system's requirements. While such "losers" in traditional societies may have constituted one of two per cent of the population, we can foresee a possible future in which this proportion increases to perhaps fifteen or twenty per cent. Such a situation, however, is likely to be intolerable for a democratic society, and ways will have to be found to provide productive employment also for this group of the population. If this is not to become a tremendous burden for the economy and for the whole social structure, educational measures will have to be applied on a vast scale, particularly for those who risk falling below the minimum requirements for the persons with functions in society.

Such policies are, of course, even more pertinent on more general welfare grounds. In view of the foreseeable developments of technology in all fields of society, the task of educating those previously regarded as more or less "uneducatable" will become one of the main tasks for the educational system in years to come. Both economic and egalitarian aims point clearly in this direction.

Relative Emphasis on Fields of Study

Another question of priority concerns the emphasis to be put on the difficult fields of educational specialisation. There are strong indications that economic requirements cannot be as rigidly interpreted in terms of needs for specific types of manpower as has often previously been assumed. The belief that specific fields of study are particularly related to economic growth has not been confirmed by studies of interrelationships between education and the economy. The highest correlation between educational effort and economic performance has, in fact, been found in connection with data on general education, while special emphasis, on for example, scientific or technical education, is not necessarily reflected in economic growth, as shown by the OECD study on "The Technological Gap".

At our present stage of knowledge, we may have got rid of certain superstitions in this area. Beyond that, we must at present be satisfied with the observation that the interrelationships in this field are very complex. But we can at least conclude that, at the moment, there is no *a priori* reason for preference for specific fields of study within the educational sector.

Formal Education and Education for Adults

Priority assessments leading towards major readjustments in the educational system will concern the relative emphasis on formal education within the regular educational system and the more or less organised education for adults. An illustration of possible implications of such readjustments is given in the Annex.

Formal and Informal Education

A strengthening of education for adults may partly take the form of extended organised education within educational institutions. The expansion in this area may also partly take the form of "semi-organised" education, whereby a large number of pupils use the same educational materials, but without necessarily being together within a physical school unit.

It seems likely that developments in educational technology will favour more extensive semi-organised education, even where the normal type of education today is full-time teaching in school. It seems in any case that the distinction between "education" and "spare time activities" will become more and more blurred in the years ahead, as will that between work and leisure time.

3. RESOURCE ALLOCATION AMONG EDUCATIONAL INPUTS

We have mentioned priority questions concerning the resource allocation among various educational objectives, i.e. quality or quantity, different types of pupils, different fields of specialisation, formal education or education for adults, and organised versus unorganised education. Some of the priority choices involved in the combination of the different educational resources will now be considered.

Productivity of Pupils' Time

The balancing of the input of pupils' time and other educational resources is essential in this context. This question is closely related to that of the productivity of education with respect to pupil input.

We have mentioned above that there seems to be considerable scope for increased productivity in this respect, through an increase in the input of other educational resources. Such a change in the relative resource input would make it possible to obtain better results without increasing the real costs to society.

Possibilities for Substitution

In the long run several factors indicate increasing possibilities for a rational substitution of this input factor. Prolonged education within the formal educational system not only claims increasingly valuable pupils' time, but also implies increasing welfare costs. The marginal productivity of the input of pupils' time also appears to be declining within the framework of formal education. This may be caused by reduced motivation among pupils' and possibly also by a decline in learning ability, at least as regards learning which is not felt to be relevant by the pupils themselves.

At the same time, technological changes in education may considerably increase the productivity of other input factors in education, the costs of which may also decline in relative terms.

All these factors indicate a policy which strongly emphasizes the utilisation of pupils' time - a far more rapid productivity increase in this respect than we have experienced in recent years. This means that input of other educational resources should expand more rapidly than that of pupils' time - a conclusion valid for education within the formal school system and even more so for the education of adults.

Substitution Between Other Resources

What we have here called "other educational resources", corresponding roughly to resources financed through public budgets, also offer considerable possibilities for internal substitution. We have previously grouped such resources into teachers' wages, purchase of goods and services, and capital expenditure. We shall first consider the possibilities for substitution between teachers' wages and the purchase of goods and services.

Teachers' Wages Purchase of Goods and Services

In recent years, expenditure for teachers' wages has increased as fast, or possibly even faster, than expenditure for the purchase of goods and services. This is partly because teachers' wages have followed the general increase in real wages in society, while the price of other goods and services has increased less rapidly. But even in real terms, it seems likely that there has been only a very moderate substitution by other factors of the input of teachers' time.

Today, most proposals for improved educational standards also imply a larger input of teachers. As an example, concrete proposals for standard improvements presented to the Norwegian Minister of Education by responsible educational bodies would if implemented, require twice as many teachers as we have today in the nine-year compulsory school.

The Alternatives

Educational policy thus appears to be faced with two equally unsatisfactory alternatives. One is to refrain from improving educational standards, and thereby also from improving the productivity of education in the long run. As shown above this is likely to be a costly and irrational solution.

The other alternative implies the recruitment and production of the number of teachers assumed to be needed for such standard improvements. In Norway, however, the teaching profession already claims a very considerable part of the country's most gifted youth. A doubling of the total number of teachers in a period of increasing demand for highly qualified manpower from other sectors of the economy, can hardly be achieved without a substantial decline in the average quality level.

Teaching techniques in the Norwegian school system are based on the kind of teachers we are used to having. A significant reduction in the quality of the recruitment basis for teachers may, of course, partly be counteracted by better teacher training. Yet it seems unlikely that such an enlarged teacher group would be able to meet the increasing requirements within the teaching profession. We risk losing in quality what we gain through increased quantitative input.

A Third Alternative Substitution

We have to look for a third alternative, providing a genuine solution to this problem. This may be the gradual substitution for input of teachers' time by other input factors, such as increased educational aids, more effective methods, organisation, etc. Such a readjustment will not be easy, and one precondition will be a major expansion of research and development in education. In the long run, however, it is difficult to foresee any other solution, if the essential aims of educational policy are to be reached.

Emphasis on Innovation

We have here a basis for definite priority decisions in educational policy, but which, in the first round, will have to concentrate on preparing the ground for future developments. Short-run measures must aim at increased receptiveness towards innovation in the organised school system and in particular by teachers. A broad policy for innovation and change will gradually have to be developed, based on close contact with other countries facing similar problems and developing similar policies. Research and development efforts - at present far from adequate - are essential. In terms of relative expansion, resource input in this field calls for top priority.

Teacher Input in Education for Adults

In adult education teacher costs are much less important than in the school system, and the possibilities for substitution are far more limited. A similar technological development, may, however, be foreseen also in this area, in terms of technical, organisational and methodological changes. Research resources may be needed even more here, both because present efforts are extremely weak in this field, and because there is promise of significant results.

An illustration of the possibilities for substituting the purchase of goods and services for expenditure on teachers is given in the Annex.

Factors behind Teacher Requirements

Assuming that a gradual "industrialising" of the educational process can be achieved, teachers' wages will still weigh heavily on the educational budget, especially in formal education. The question therefore still remains of how teacher input can most effectively be allocated to a number of different functions.

Hours taught in Full Class

In Norway, teacher requirements have increased in recent years, mainly because of an increase in the number of hours taught in full class. This increase has been particularly heavy in primary schools, but is also noticeable in higher education. In primary education this development is caused by the gradual abandoning of a three-day school week in the rural areas. Differences in the number of teaching hours available to pupils are likely to be eliminated in the future.

Doubts have been raised, however, about the productivity of teaching at the end of a long school day. A further increase in the number of hours taught may therefore have little impact on real teaching standards in primary education. In secondary education, the question is whether the present number of hours taught might be reduced. The same applies to certain fields of study in higher education, although others may still profit from an increase in the number of hours taught.

The Size of Classes

The utilisation of teachers' time will depend upon the size of the pupil groups being taught. A large group will permit many pupils to benefit from the same teacher input, the usual assumption, however, being that the effectiveness of teaching declines as class size grows.

Organisational Differentiation

In primary education, we now have strong pressure towards more organisational differentiation, in terms of a breaking up of traditional classes into smaller groups. At the lower secondary level, the need for such differentiation arises from modifications to curricula for individual pupils, the actual number of "extra hours" for this being considerable at this level. Strong pedagogical reasons, however, also point towards similar differentiation in primary schools, and particularly in beginner classes. A further increase in the number of extra hours taught may therefore be expected.

In upper secondary general education there is today very little organisational differentiation; vocational schools often work with small pupil groups. The trend towards an increased number of subjects offered and more freedom of choice and possibly also an integration of general and vocational education at this level will undoubtedly lead to a substantial increase in the need for organisational differentiation, and consequently for extra teaching hours.

At university level, conditions vary considerably according to field of study, as do costs per student. Such cost differences do not seem to have emerged as the result of any systematic analysis of needs in the different fields of study. At present, there seems to be strong reasons for more intensive teaching in such fields as arts, social sciences and law.

In the long run, the need for organisational differentiation is more uncertain. It seems possible that a further development of educational technology will offer pedagogical alternatives in terms of individual differentiation taking place within the class. This may represent the greatest possibility of saving teacher time. A development in this direction, however, cannot be expected in the immediate future. Another sphere for rational substitution is that of technical and administrative functions connected with educational activities. Within the school system today, such tasks are mainly undertaken by teachers. Considerable possibilities already exist for substituting other technical and administrative personnel, and possibly also technical equipment for teachers in such functions.

The work load of Norwegian teachers, at least for certain groups, makes it difficult for them to perform their duties within normal working hours. This will obviously influence the efficiency of their teaching. A reduction in teaching duties, especially in primary schools, would probably lead to significant productivity gains.

The development towards a higher input of technical aids and more complex methodological approaches will increase substantially the need for teaching preparation. Such a development will depend, therefore, partly on a reduction in the present teacher work load, even if this reduces the substitution effect of a gradual "industrialisation"(1).

The Need for Retraining

In the future, teacher retraining will require far more resources than in the past. A substantial increase in such retraining as part of the normal working conditions of teachers is already needed in the short run. Retraining may take many forms, including work with self-instructing material, demonstrations and courses of short or long duration. Before the end of the period under consideration at least one tenth of the working time of a teacher might be spent on retraining.

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(1) This process, however, is parallel to industrialisation processes in other sectors of the economy, based on expensive equipment and complex technical methods.

Uncertainty in Assessments

We have mentioned some of the factors determining the need for teachers. Priority decisions relating to the alternative use of teacher resources are based partly on assumptions concerning the pedagogical relations between input and results, and partly on assumptions concerning further developments in educational technology. Our present knowledge of these questions hardly permits more definite conclusions than those indicated above, concerning priorities in the long run.

As an illustration, however, of possible alternatives in the long run an attempt at quantifying some of the relationships in question has been included in the Annex.

Capital Input

For practical reasons, capital investments have been excluded from the above analysis, in spite of the fact that to a certain extent capital input and current expenditure may substitute each other. School capacity which is either too big or too small may easily lead to higher current costs than are necessary.

The obsolescence of capital investments raises a particular problem: the fact that such investments are likely to be used for a long period may delay the development of more rational methods and increased productivity in teaching. For example, the limitations set by inadequate buildings and equipment to experiments with teaching in groups of various sizes.

The main problem affecting capital investments in education in the years ahead concerns this reduced productivity caused partly by "technical" obsolescence, and partly by changes in the population structure. It is difficult to foresee how this will influence the future need for capital investments, which partly depend on whether we succeed in finding solutions permitting productivity to increase within the framework of existing premises.

In spite of the growing risk of obsolescence, it seems likely that standard improvements in terms of space per pupil will be less rapid than the rise in current expenditure per pupil. In the long run, investment expenditures will, therefore, represent a declining proportion of total educational costs.

In Norway, where capital expenditure in education is exceptionally high at the moment, the investment level in real terms in the 1980s may not be substantially higher than today.

Partial and Qualitative Priority Assessments

Our discussion in this chapter of some of the priority assessments connected with the long-term development of the educational sector has been partial and qualitative, while in principle it should have been simultaneous and quantitative.

An attempt at a more adequate handling of these priority problems, at least in formal terms, is given in the Annex, where we have tried to combine some of the main factors determining the need for resources in education, and to postulate certain relationships between these factors. As an illustration, we have also assigned quantitative values to some of the factors.

Illustration Model in the Annex

The resulting model is a cost model which, avoiding the explicit presentation of objectives, cannot tell what might be an "optimal" policy in relation to given aims. However, the alternative combinations of the quantitative values chosen are assumed to be equivalent in terms of the total outcome of the educational process.

The basis for model work of this kind is, of course, very uncertain. We lack knowledge about even the present value of many factors involved. We are even more ignorant as to the actual interplay between the various factors and objectives. Finally, inter-relationships between objectives are far from being clarified, even apart from the question of the normative weighting of the various objectives.

The model presented in the Annex should, therefore, primarily be viewed as an illustration of the strategic problems facing us in the years ahead. It is intended to point out possibilities, rather than to state facts or draw definite conclusions.

VI. POLICY INSTRUMENTS IN EDUCATION

1. THE INSTRUMENTS USED

In educational policy, as in most other fields, legal, financial and informative policy instruments are used. The relative emphasis put on these different types of instrument varies, however, according to the forms of the educational activity concerned.

Legal Instruments

In the formal school system in Norway, legal instruments traditionally play an important part. Acts, statutes, instructions, regulations, rules, etc. determine the values of most of the factors in education, and sometimes also the relations between such factors. In some cases, legally determined maximum and minimum limits are applied, between which the factors are permitted to vary.

More Emphasis on Financial and Informative Instruments

Tendencies in the school system seem, however, to point towards a gradual substitution by financial and informative instruments of legal ones. The former permit a far greater flexibility of the steering mechanism, with more delegation of authority without loss of control over the main direction. Such a shift in the use of instruments reduces the need for central control and may stimulate local initiative and engagement.

This gradual shift can be expected to continue in the years ahead, a development that will lead to a change in the functions of central educational authorities towards more emphasis on general planning, development work and dissemination of information.

Adult Education

In the education of adults, in both work and spare time, the public system of policy instruments is far less developed. To the extent that such instruments are available, the main emphasis lies on financial and informative measures.

In the long run, a somewhat stronger development of the political steering mechanism may be foreseen in this field and perhaps more particularly in connection with work time education. A more extensive use of legal instruments seems likely, possibly also in the form of contractual arrangements between the parties in the labour market, or betweeen individual workers and employers.

In spare-time education a more extensive use of legal instruments is less likely. However improved organisation and control over the very incoherent educational supply in this field may be needed.

2. FINANCIAL INSTRUMENTS

As we are concerned with future resource needs in education, our discussion will concentrate mainly on the use of financial instruments, which in future may have a more important part to play in educational policy.

The Public Share of Educational Financing

The part of educational financing covered by public resources in Norway varies widely according to the type of educational activity concerned. In the formal school system the public share may be estimated at about 50 per cent, on the assumption that the time input of pupils below 15 years of age has no economic value. For adult education, both in work and spare time, the public share is insignificant.

The Public Share of Institutional Expenditures

The public financing of education is mainly concentrated on the direct expenditure of educational institutions. The principle that pupils shall not take part in the financing of educational institutions is firmly established. However, such direct educational expenditure constitutes, as mentioned above, only a minor part of the total costs in many types of education, and especially at the upper levels, where further expansion will mainly take place.

This distribution of responsibilities for educational financing may be reflected in irrational judgements in educational policy. Public authorities will quite naturally think in terms of cost factors financed through public budgets, and tend to underrate the real costs to society of inputs financed in other ways. This leads to sub-optimum combinations of input factors, and a consequent reduction of productivity in education.

Reasons for Public Support

Public subsidies for educational activities are granted for several reasons, such as:

- Public engagement in the financing of education is a condition for the proper functioning of the legal system of steering and control.
- The subsidizing of education costs is required to obtain an adequate demand for education, from the point of view of the society.
- The distribution of education among individuals is assumed to become irrational if its financing is left solely to the pupils and their families.

It is hardly necessary here to explain the reasons why a certain amount of legal control over education is desirable. Control of this kind has been found necessary in practically all countries. To the extent that the effective functioning of such control depends on the public financing of education, this is, therefore, a strong argument for the maintenance of such support.

This will become even more important, if, in the future, financial instruments are expected to take over some of the functions at present entrusted to legal instruments. Such a shift requires a substantial public share in the financing as a necessary precondition.

Educational Needs of Society

The view that the public financing of education is necessary because private demand would not otherwise correspond to the needs of society is commonly held in most countries. Reference is made to the desirable side-effect of the education of one individual upon the situation of other individuals ("external economics"). Furthermore, the individual and his family will often lack the possibility of adequate insight into the future increase in educational requirements.

To the extent that such arguments are valid, they should indicate a stronger public participation in the future. Mutual dependence on other people's educational level will increase with the greater complexity of society, and the more rapid changes in all fields indicate an accelerated increase in educational requirements.

In addition, personal services are a dominant cost factor in education. This means that real costs in this field are likely to increase more rapidly than those of other alternatives, competing for the time and personal resources of the individual. A change in relative costs to the disadvantage of education is quite likely to occur.

Public Coverage of Income Foregone

The loss of income during education is the main cost factor in all education beyond the compulsory level. In Norway, the public share in the financing of such costs is very moderate, presumably about 10 per cent, even including loans.

Costs in terms of income foregone will increase continuously, due to the rise in real wages and because educational expansion will mainly occur at the level of higher qualification. There is already a growing reaction among students against the reduction in consumption element in educational financing for the pupil and his family. The older pupils (students) in particular appear to find it difficult to accept the great difference between their own living standards and those of their age groups already at work. We may have to contend here with a factor which does not primarily depend on a balanced analysis of all the economic advantages and sacrifices connected with education, other psychological questions being more important in this context. The pressure for a greater public share in the financing of income foregone during education is likely to increase in the years ahead.

Stimulating the Demand for Education

In the short run the achievement of a proper balance between the demand for education and the capacity of educational institutions is a natural goal. In the present Norwegian situation, the institutional capacity is in fact often the bottleneck. In a long-term perspective, however, such limitations have much less influence. For the reasons mentioned above, the need for the demand for education to be generally stimulated by subsidizing educational costs will tend to increase in the future.

Equalizing Educational Opportunities

If education is regarded as a right for everybody, the public will have to compensate for individual inequalities of background due to geographical and social reasons. When education is made compulsory, normal conceptions of justice imply that public authorities have a duty to compensate unequal economic consequences for different individuals and groups. Further arguments for such an equalization policy, also at voluntary stages of education, are based on the wish to obtain a better composition of the pupil body in view of its potential as a human resource.

Measures aiming at greater equality of opportunity for education claim a considerable part of the public subsidies offered to education today. About one-third of the budget of the Norwegian Ministry of Education for education is, for example, based upon selective geographic or social criteria. The extent to which such emphasis on equalitarian objectives in education will be maintained in the future will depend largely on the extent to which we shall be able to fulfil the more general egalitarian aims in our society. If we fail to obtain these more general objectives, equal educational opportunity can be implemented only through increased public subsidies for the purpose.

The Development of Public Support

For the formal school system, our conclusion is that most of the relevant factors seem to point towards a gradual increase in the public share in the financing of education.

For education for adults, in both work and spare-time, far more public responsibility for financing than at present seems likely. In spare-time education, however, the public share will still be much smaller than in the organised school system. For work education the situation is more uncertain. One of the questions involved is whether certain forms of financing will be regulated through contractual arrangements or be included in the general system of social security.

Assumptions about Political Priorities

The degree of public responsibility for the financing of education is, of course, to a great extent a question of policy choice. We have here made the assumption that policy decisions in this area will be influenced by the desire for greater productivity and more rational combinations of input factors in education. If such objectives are accepted, the main direction in the use of financial instruments indicated above should be valid.

Central Government/Local Government

Today the distribution of responsibilities for financing between the central government, the counties and the communes leave the central government with about half the public expenditure. Present tendencies point towards a growing pressure on the central government, while the expenditure of counties and communes for educational purposes will rise only moderately. This follows from the present division of functions and the legal regulations for support. The most expanding types of education have the greatest share of central government financing, while school building activities mainly entrusted to local authorities, are likely to decline in the near future.

Uncertainty about Future Developments

It would not be meaningful in this context to present strong views on how public responsibilities for the financing of education will or should be distributed in the long run. This will depend upon a wide set of factors connected with public activities at different levels, well outside educational policies.

However, a general question worth mentioning in this respect is the connection between the responsibility for operational activities and for their financing. Even in the future the major part of educational activities in Norway will administratively be run by local authorities. Such a delegation of responsibility, however, should be combined with the real responsibility for financing. Otherwise, even far more rigid control measures than those applied at present may be needed. It is quite possible, however, that the foreseen future shift in financial responsibility emerging from our present system of subsidizing may cause a considerable lack of balance in this respect.

VII. CONCLUDING REMARKS

Findings of the Analysis

In our analysis we have shown that in the long run the need for educational resources does not depend only, and perhaps not even primarily, on the number of pupils in the regular school system. The various forms of educational activities - formal school education, work and spare-time education, family education - offer a wide range of alternatives for the input of pupils' time, with strongly differing consequences for the total resource input and for the public financing of education. We have also discovered reasons for believing that the present distribution of educational resources among these forms of educational activities may be far from rational, and that a shift in emphasis will be needed even more in the future.

We have also found that the input of pupils' time needed to fulfil educational objectives is highly dependent on the extent to which we are able to make good use of this essential resource in education. Substituting other resources for pupils' time, and thus raising educational productivity in its most meaningful sense, offers substantial possibilities for economies to be made in the educational process, as seen from the point of view of society.

In financial terms, however, this means that political authorities will have to accept fully the costs to society of educational activities with the consequent re-evaluation of the role played by public financing in this sector. Again, we have found reason to believe that the present resource combination in education is far from optimum and this bias may become even more grave in the future.

Furthermore, we have found that better utilisation of pupils' time does not necessarily have to be obtained only through pouring in more teachers into education. Other resources may be substituted for teacher input to a significant extent. Substantially increased efforts in educational research and development may greatly widen the scope for such substitution.

Finally, we have found that the teacher input in the educational process may be used in many different ways, with major differences in pedagogical results. In this case, too, traditional views may have to be abandoned in order to make the best use of this resource to meet the new tasks facing education in future.

Other Factors Equally Important

Yet our analysis has covered only part of the ground. In the future, structural changes in education may have a substantial effect on both the demand for and the actual content of education. Major changes in teaching style, in educational substance and in values transferred through the educational process may be expected. Educational activities serve many objectives; the possibility cannot be excluded that in the future major shifts in emphasis on such objectives may occur in educational policy.

Such factors have not entered into our analysis of the future. They may, however, represent the greatest challenge to educational policy in the years ahead, decisions to be taken in these respects being perhaps even more important than those dealt with here for the future of education and of our societies.

Analyses of the potential developments of such factors will require studies going far beyond the aspirations of this paper. However, if educational planners want to come to grips with the most basic issues in educational policy, they will also have to face such questions and find ways of including them in their analyses.

Annex

QUANTITATIVE ILLUSTRATIONS OF ALTERNATIVES FOR EDUCATIONAL POLICY

1. THE MAIN MODEL

Weak Factual Basis

Quantitative information on total educational activities in society is to a great extent lacking. Consequently, when in the following illustrations we try to illustrate some of the basic priority choices facing educational policy-makers, it is necessary to underline that the actual figures chosen are often arbitrary. This is true for the factors included in the model, and even more so for their interdependencies.

What follows, therefore, must be considered as an illustration of some of the problems raised in this paper, and not as forecasts of the development of various factors, or postulates concerning the interplay of these factors.

The use of symbols in the following analysis is a practical measure. Although, potentially, a very sophisticated model might be developed on the basis of the previous analysis, we have chosen to present a very simplified model in which a large series of problems have been "defined away."

Various Forms of Education

The total need for resources in educational activities (U) is assumed to represent the need for resources in the four main forms of educational activities(1):

G signifies the need for resources in the formal school system

A signifies the need for resources in work-time education

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(1) $U = G + A + F + H$

F signifies the need for resources in spare-time education

H signifies the need for resources in family education.

Various Types of Resources

Resources of various types enter into each of these forms of educational. We shall concentrate on six main types of resources as follows(1):

E signifies the input of pupils' time
L signifies the input of teachers' time
T signifies the input of other salaries
V signifies the purchase of goods and services
R signifies research and development expenditure
K signifies other capital input.

In a later section of this annex, we shall specify a simple submodel for the input of teachers' time in formal education (L_G) in order to illustrate some of the specific priority choices connected with the utilisation of teacher resources. Through this submodel, a connection is made with cost models and teacher requirement models already in use in the Norwegian Ministry of Education(2).

2. THE INPUT OF PUPILS' TIME IN 1967

As a gross simplification, we shall here distinguish between two groups of pupils in formal education; pupils under 15 and those 15 and over.

The Economic Value of Pupils' Time

The assumption is made that pupils under 15 years of age have an average time input of 1,250 hours per year, in terms of hours in class and homework. This time input is regarded as having no economic value.

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(1) As an example, $G = E_G + L_G + T_G + V_G + R_G + K_G$, and correspondingly for the other forms of education.

(2) See the OECD document "Study on the Demand for and Supply of Teachers. A Case Study in the Application of Teacher Demand and Supply Models in Norway" (DAS/EID/67.21).

Pupils of 15 and over are each assumed to have an average time input of 2,000 hours a year, and the average economic value of this time input is estimated at Cr. 20,000 or Cr. 10 per hour. This estimate is based on the present average income per person employed(1). On the one hand, the pupils in question are very young, and must be assumed to represent a lower than average productivity level. On the other hand a large proportion have already obtained educational qualifications far beyond the average of the actual labour force.

The use of income expectations as a basis for estimating the productive potential of pupils might be questioned. The average production per employed person in the Norwegian economy is about Cr. 30,000 per year. Similarly, questions might be raised on the use of the value of marginal labour input as the basis for assessing the value of the alternative allocation of major groups of the manpower potential. For our purpose of illustrating certain types of problems, however, such considerations have only limited significance.

The number of pupils in organised education in Norway is about 700,000, of which about 235,000 are 15 years of age or more. On the assumptions made above, estimated pupils' time input is 600 million hours for those under 15, and 450 million hours for those 15 and over. In economic terms our assumptions attach a total value of Cr. 4,500 million to pupils' time input in formal education (E_G).

Time Input outside Formal Education

The time input of pupils in work-time education is not known. As an illustration, however, we assume an average input of 0.5 hour per day so that 275 annual working days and 1,550,000 employed persons give a total of 215 million hours spent on work-time education in 1967. Valued at Cr. 10 per hour, the economic value of pupils' time input in work-time education (E_A) is Cr. 2,150 million.

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(1) It might have been more appropriate to use the average income per employee. This would have given an average of Cr. 26,000, in 1967.

The time input of pupils in spare-time education also can be given only as an illustration. The number of adult people outside school in 1967 was about 2,700,000. Assuming a daily time input of 0.5 hour, the total time input amounts to 500 million hours a year, corresponding to an economic value of the input of pupils' time in spare-time education (E_F) of Cr. 5,000 million.

The input of pupils' time in family education (E_H) is likely to have a more limited economic value, and will not be quantified here.

Under the assumptions chosen for illustration purposes, the economic value of pupils' time input into educational activities (E) in 1967 was of the order of Cr. 12,000 million.

3. THE INPUT OF OTHER EDUCATIONAL RESOURCES IN 1967

Teachers' Salaries

Teachers' salaries in formal education (L_G) in 1967 amounted to about Cr. 1,500 million. This corresponds to about 45 million hours of teaching, at an average cost per hour of Cr. 33. Corresponding costs in work and spare-time education are not known. For illustration purposes, we shall choose Cr. 200 million (L_A) and Cr. 100 million (L_F) respectively. Expressed as hours of teaching, this corresponds to 6 million and 3 million hours respectively, if we assume the same cost per hour as in formal education.

The corresponding costs for family education will depend on the situation of the parents, and may be assumed to be considerable, although we shall not try to estimate them.

The total input of teachers' time into education (L) - family education excluded - may be estimated at Cr. 1,800 million in 1967.

Other Manpower Input

Expenditure for other salaries in formal education (T_G) in 1967 amounted to approximately Cr. 500 million. Corresponding costs in work and spare-time education and in family education are assumed to be small.

Purchase of Goods and Services

Expenditure on the purchase of goods and services in formal education (V_G) in 1967 amounted to approximately Cr. 600 million. Corresponding costs in work and spare-time education are not known. For illustration purposes we have chosen Cr. 100 million (V_A) and Cr. 200 million (V_F) respectively(1).

Total expenditure on the purchase of goods and services in education (V) under the given assumptions amount to Cr. 900 million in 1967.

R & D Expenditure

Expenditure on R & D relevant to educational activities (R) in 1967 are estimated to about Cr. 5 million.

Capital Expenditure

Capital expenditure in formal education (K_G) in 1967 amounted to approximately Cr. 650 million. Corresponding expenditure on work and spare-time education is estimated at Cr. 50 million (K_A) and Cr. 150 million (K_F) respectively(2).

The total input of capital resources into education (K) is thus estimated at Cr. 850 million in 1967.

4. ALTERNATIVES FOR THE INPUT OF RESOURCES IN 1990

Choice Alternatives

In formal education, some choice alternatives in 1990 are shown by the following combinations of resource inputs.

Assumptions Underlying Alternative 1990 (I)

We have arrived at alternative 1990 (I) as follows: pupil numbers have been estimated by means of a general flow model of

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(1) This includes the purchase of books, papers and journals, which have an educational effect. The total sale of all forms of literature, daily papers included, amounted to Cr. 665 million in 1967.

(2) These figures should be viewed against the background of a total purchase of radio and TV sets amounting to Cr. 325 million in 1967.

Million Cr.

	1967	1990 (I)	1990 (II)	1990 (III)	1990 (IV)
E_G	4,500	18,750	15,500	15,500	15,500
L_G	1,500	8,500	9,350	7,500	6,800
T_G	500	2,800	3,100	3,400	3,100
V_G	600	1,200	1,300	1,550	1,400
R_G	5	50	50	50	200
K_G	650	1,050	1,150	1,150	1,050
G	7,750	32,350	30,450	29,000	28,000

the educational system(1). The estimates resulting from this model correspond roughly to an extrapolation of the demand for education trend given earlier in this paper (cf. p. 41). The average estimated number of school years for new-comers to the labour market in 1990 is about 14. In other words, factors pointing towards an upward shift in this trend have not been taken into account.

Number of Pupils

The total number of pupils in 1990 is estimated at slightly more than one million, an increase of 40 per cent over 1967, and of those 15 years of age and over at 370,000 or 65 per cent more than in 1967. The annual average time input of pupils is assumed to be the same as in 1967, although this may represent too high a figure in a society tending towards a general reduction in working hours. Sticking to this assumption, however, the total time input in 1990 amounts to 800 million hours and 750 million hours for pupils under 15 years of age and 15 years and over, respectively.

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(1) For a description of this model, see K. Eide "The Demand for and Supply of Teachers. A Case Study in the Application of Teacher Demand and Supply Models in Norway." (DAS/EID/67.21)

The Value of Pupils' Time Input

An annual growth rate of 4 per cent for real wages represents an increase of 150 per cent from 1967 to 1990. The economic value of the time input of "grown up" pupils is therefore estimated at Cr. 50,000 per year, or Cr. 25 per hour in 1990. The total value of pupils' time input in formal education (E_G) in 1990 amounts to Cr. 18,750 million.

Teacher Input

The more detailed basis for estimating teacher input in 1990 is outlined in section 6 below. The estimate corresponds roughly to an extrapolation of the teacher-time input per pupil trend observed for the most recent 20-year period. The resulting rise in standards in terms of increased teacher input, does not at any point exceed proposals from presumably responsible sources already presented to the Minister. The estimate is also strongly influenced by the increase in pupil numbers in levels of education requiring a higher proportion of teachers.

The number of teaching hours required under this alternative is 82 million per annum, an increase of 82 per cent over 1967. This implies an increase in the number of teaching hours per pupil from 58 in 1967 to 82 in 1990. This increase of about 43 per cent is thus higher for teacher requirements than for the growth in pupil numbers.

Teacher salaries are assumed to increase in step with the rise in the general level of real wages, which corresponds to Cr. 104 per hour in 1990(1). The total value of teacher input in formal education (L_G) in 1990 amounts to Cr. 8,500 million.

Other Current Inputs

Salaries other than teacher and research and development expenditure are assumed to increase in step with the increase in teachers' salaries, while the purchase of goods and services is assumed to grow in step with the input of teachers' time.

Capital Input

Capital requirements have been estimated as follows: school space per pupil today is about 6 m^2 net in compulsory education, about 10 m^2 in the "gymnasium" and 20 m^2 in vocational schools. In post-secondary education, a rough estimate is about 20 m^2 per pupil. The total area of school buildings today is about 5.5 million m^2 net.

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(1) The average amount paid per hour increases more than the rise in real wages, due to a relative increase in the requirements for highly qualified teachers.

In 1990, space requirements per pupil are estimated at 8 m^2 net during the first nine school years, 20 m^2 net for the upper secondary level, and 25 m^2 net for post-secondary education. The growth in space requirement per pupil stems mainly from the rise in standards indicated above. The total need for new school space in the period up to 1990 would be of the order of 6.5 million m^2 net, or an increase of about 120 per cent.

The obsolescence of school buildings is assumed to increase with the rapid technological development in education. We have chosen a rate of amortisation of 3 per cent, which corresponds to an increase in annual replacement needs from 150,000 m^2 net in 1967 to 350,000 m^2 in 1990(1).

Construction costs per m^2 are estimated at Cr. 1,000 for the first nine school years, Cr. 1,500 for the upper secondary level and Cr. 3,000 for post-secondary education. Assuming a fairly equal distribution of additional investments for the period, capital input into formal education (K_G) will increase gradually from the present figure of Cr. 650 million, to Cr. 1,050 million in 1990. This indicates a substantial reduction in the relative importance of capital input.

Other Alternatives

Alternative 1990 (II) differs from the above alternative in that the input of pupils' time in 1990 is assumed to be 130 million hours, or 8 per cent less. This corresponds to about one year less of formal education for new-comers to the labour market. This reduction in the input of pupils' time is assumed to be compensated through a rise in the input of all other resources of 10 per cent.

Alternative 1990 (III) assumes the same time input of pupils as alternative 1990 (II). An important substitution of teachers by other resources is assumed to take place. The input of teachers' time is reduced by 20 per cent in relation to alternative 1990 (II), while the input of other manpower is increased by 10 per cent, and the purchase of goods and services (teaching aids, etc.) is increased by 20 per cent.

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(1) Maintenance is here counted under purchase of goods and services.

Alternative 1990 (IV) differs from alternative 1990(III), a large amount of research and development expenditure having been substituted for inputs of teachers, other manpower, purchase of goods and services, and capital. R and D expenditure is assumed to be quadrupled, while the factors mentioned above are reduced by 10 per cent.

Consequences for the Total Resource Input

These four alternatives for combinations of resources in formal education in 1990 differ significantly in terms of total resource needs. We have not at present sufficient knowledge to judge whether the different alternatives would produce roughly the same results. We do know, however, that substitution possibilities of the types indicated exist in education and that a systematic utilization of such possibilities could lead to a reduction in total resource needs.

Alternatives for Work-Time Education

Similar alternatives for work-time education in 1990 can be constructed. The following alternatives for resource input in 1990 have been chosen.

Million Cr.

	1967	1990 (I)	1990 (II)	1990 (III)
E_A	2,150	10,500	8,500	7,500
L_A	200	1,500	2,500	2,500
V_A	100	300	500	1,000
K_A	50	150	200	250
A	2,500	12,500	11,700	11,250

Alternative 1990 (I) Employed Persons' Time Input

Alternative 1990 (I) is based on the assumption that each employed person spends an average of one hour per day in improving his educational qualifications. With an estimated 1,600,000 employed and 260 working days per year, this amounts to a total input of pupils' time of 420 million hours. At Cr. 25 per hour, the total value of pupils' time input in work education (E_A) in 1990 amounts to Cr. 10,500 million.

Teacher Input

The input of teachers per pupil hour is assumed to increase by 50 per cent, giving a total teacher input of 18 million hours in 1990. This implies a certain expansion of the organised part of work-time education. If a teacher hour is estimated at Cr. 85, the total value of teacher input in work-time education (L_A) in 1990 amounts to Cr. 1,500 million.

Purchase of Goods and Services

The purchase of goods and services is assumed to increase in step with the input of teacher time. Capital input is arbitrarily estimated at Cr. 150 million.

Other Alternatives for 1990

Alternative 1990 (II) implies a far heavier input of teacher hours in work-time education, assumed to make possible a certain reduction in the input of pupils' time without loss of educational results. The purchase of goods and services is increased in proportion to the teacher input, as compared to alternative 1990 (I).

Alternative 1990 (III) is based on the assumption that a further increase in the effective utilisation of teachers' time can be obtained through a larger input of teaching aids. Teacher input is kept at the same level as in alternative 1990 (II), while capital input is slightly increased.

Alternatives for Spare-Time Education

For spare-time education the following alternatives for resource input in 1990 have been chosen.

Million Cr.

	1967	1990 (I)	1990 (II)
E_F	5,000	26,500	20,000
L_F	100	1,000	2,000
V_F	200	800	1,500
K_F	150	400	500
F	5,500	28,700	24,000

Alternative 1990 (I) illustrates a situation in which adults who have completed their formal education, spend an average of one hour daily on spare-time education. For 2,900,000 persons, the input of pupils' time amounts to 1,060 million hours. At Cr. 25 per hour, the total value of the input of pupils' time in spare-time education (E_P) in 1990 is Cr. 26,500 million.

The teacher input per pupil hour in this alternative is assumed to be double that for 1967 amounting to a total of 12 million hours in 1990. The organised part of adult education is thus assumed to expand. On the basis of Cr. 85 per teaching hour, the value of teacher input into spare-time education (L_P) in 1990 will amount to approximately Cr. 1,000 million.

The purchase of goods and services is assumed to increase in step with the input of teachers' time, while capital input is arbitrarily fixed at Cr. 400 million.

Alternative 1990 (II) is based on the assumption that pupils' time can be more effectively utilised through a considerable increase in the input of teachers, and of teaching aids.

Family Education

Although resource needs for family education are not specified in this context, they are likely to increase far less than those in other forms of education.

5. ALTERNATIVES FOR BALANCING THE DIFFERENT FORMS OF EDUCATION IN 1990

Alternative Resource Allocations

As pointed out in this analysis, possibilities exist for reallocating educational resources among the various forms of education. As the results of such reallocations may be assumed, not primarily, to depend upon the resource combinations used within each form of education, we have compared only the various alternatives termed 1990 (I) for each form of education. The figures chosen for family education are quite arbitrary, the only purpose being to illustrate a change occuring in one of the alternatives.

The Alternatives Chosen

The following table illustrates alternatives in the emphasis to be put on each form of education.

Million Cr.

	1967	1990 (I)	1990 (II)	1990 (III)
G. Formal education	7,750	32,500	26,500	24,000
A. Work-time education	2,500	12,500	13,200	13,200
F. Spare-time education	5,500	28,700	30,500	30,500
H. Family education	2,000	5,000	5,000	4,200
U. All education	17,750	78,500	75,000	72,000

Alternative 1990 (I) consists simply of a combination of corresponding alternatives as set out previously.

Alternative 1990 (II) is based on the assumption that a reduction in formal education of about one year - i.e. of about 130 million pupil hours - can be compensated through an increase in work and spare-time education by 100 million pupil hours, distributed proportionately between the two forms of education.

Alternative 1990 (III) is based on alternative 1990 (II) but the additional assumption is made that formal education starts one year earlier, and that curricula throughout formal education can be assimilated by pupils one year younger(1). As a consequence of the lower starting age, it is also assumed that 20 per cent of the mothers of children in the first class enter the labour force, in addition to those already employed. We have illustrated this by reducing the assumed resource needs in family education by the economic value of this addition to the work force(2).

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(1) The general assumption made here, that the time input of pupils under 15 years of age has no economic value, implies a simplification leading to an underestimation of resource needs in this particular alternative.

(2) The actual value of input into family education is not likely to be reduced to an extent corresponding to the value of additional manpower available for paid employment.

We again wish to emphasize that very little is known about the effects of the substitutions indicated above. We do not know with any degree of certainty whether such economies in resource utilisation as are indicated by the figures used for illustration can be obtained in practice. On the other hand, we cannot exclude a priori the possibility that substitution effects may be even greater than those implied in our alternatives.

6. ALTERNATIVES FOR THE USE OF TEACHERS' TIME IN FORMAL EDUCATION

The Factors behind Teacher Input

Teacher requirements are primarily determined by the following factors:

1. Hours taught in full class;
2. Extra hours(1);
3. Class size;
4. Teaching obligations;

Compulsory Education

The average value of each of these factors in compulsory education in Norway is as follows:

	Grades 1-6	Grades 7-9
1. Hours taught in full class	23 h/week	36 h/week
2. Extra hours	6 h/week	11 h/week
3. Class size	20 pupils/cl.	25 pupils/cl.
4. Teaching obligations	32 h/week	25 h/week

This results in an annual teacher input of 58 hours per pupil in primary education and 75 hours per pupil in lower secondary. The total input of teachers' time in compulsory education (grades 1-9) amounts to 30.5 million hours(2).

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(1) Extra hours of instruction per class consisting of instruction in divided classes, remedial teaching, pedagogical supervision, administration, hours taught by substitutes during teachers' leave, etc.

(2) Teachers' time input is calculated in the following way:

$$L = \frac{E\,(a + b)\,u}{c}$$

L is teachers' time input, E the number of pupils and u the number of school weeks in a year.

Hours Taught in Full Class

The new Act on compulsory education in Norway establishes a maximum limit of 24.5 hours per week(1) for hours taught in full class in primary school. Local authorities responsible for schools with a lower average number of hours taught are expected gradually to raise the amount of teaching up to this maximum limit. The expected introduction of a five-day school week will have little effect on this development, as the number of weekly hours is still fairly low.

At lower secondary level, on the other hand, the introduction of a five-day week is likely to reduce the number of pupil hours to 30 per week.

Extra Hours

The number of extra hours depends upon a number of factors, the most important of which is the pressure for more organisational differentiation of teaching, so as to increase pupils' range of choice and benefit from smaller groups in class. New media for teaching may provide better possibilities for individualised teaching inside the class, but the pressure for more effective instruction is still likely to be met at least partially by more widespread organisational differentiation.

Remedial teaching represents a special form of organisational differentiation, and is also said to be in need of expansion. Increased pressure for including in the ordinary school system pupils who are at present taught in special schools will increase the extra hours required for remedial teaching.

Pedagogical supervision and administration will also claim a greater share of the total teacher input, in the search for improved efficiency.

The need for teacher substitutes may be influenced by the increasing share of females in the teacher force. More important however, is the need for teacher retraining, which will increase substantially with the development towards more complex educational technologies.

Class Size

The size of classes in primary schools has grown in recent years as a consequence of concentration tendencies on the part of the population and of centralising the schools in areas with a scattered population. The implementation of the nine year compulsory school is expected to raise the average class size in primary schools to 22 pupils. Further developments will depend upon whether the tendency towards centralisation is carried further, and upon possible changes in the maximum limits for class size. Proposals for reducing the present maximum class-size limits are based on the same arguments as proposals for more organisational differentiation, and a reduction in class size would reduce the need for such differentiation.

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(1) Average for the 6 lowest grades.

At lower secondary level, there is little scope for increasing the class size as long as the present maximum limits are maintained. There may be a tendency towards accepting smaller schools at this level than envisaged in the initial proposals for nine-year compulsory education. Such tendencies, however, are likely to be outweighed by further concentration in the population structure.

Teaching Obligations

Today, teaching duties are likely to be too heavy for teachers to carry out properly within normal working hours. This is particularly true of primary education. The pressure towards reduced teaching duties is already very strong, and will be further strengthened by the introduction of more complex technologies in teaching.

Alternatives for the Allocation of Teacher Input

The same total input of teacher resources can be distributed very differently among the various factors specified above. The resulting variations in the composition of teacher input are assumed to have substantial pedagogical consequences, so that the choice of alternatives in this respect has major implications for educational output.

To simplify matters, however, we shall here indicate only two alternatives, differing considerably in terms of total need for teacher resources. The first alternative (I) is based on present trends and implies the acceptance of most of the proposals for improvements in teaching standards put forward today. The other alternative (II) assumes a considerable substitution of other input factors for teacher resources.

	Grades 1 - 6		Grades 7 - 9	
	(I)	(II)	(I)	(II)
1. Hours taught in full class	24	24	30	30
2. Extra hours	15	10	20	10
3. Class size	19	23	22	26
4. Teaching obligations	26	24	22	20

Alternative (I) represents an annual teacher input per pupil of 82 hours in primary and 92 hours in lower secondary schools in 1990. This corresponds to an increase in the number of hours taught per pupil of 41 per cent and 23 per cent respectively. Measured by the number of teachers required, the increase amounts to 75 per cent in primary and 40 per cent in secondary.

Based on the estimated number of pupils in 1990, the total teacher input according to alternative (I) amounts to 60 million hours, or nearly 100 per cent more than today. The number of teachers required will be about 60,000 compared to 25,000 today.

Alternative (II) indicates a radically different situation in which maximum class size is maintained, while the input of other resources is assumed to compensate a far less organisational differentiation. As a consequence of the more complex educational technology assumed here, teaching obligations are reduced in comparison to alternative (I).

Alternative (II) results in an annual teacher input of 60 hours per pupil in both primary and lower secondary education. The total input of teachers' time is 42 million hours and the number of teachers required 47,000. This represents a reduction in comparison to alternative (I) of 30 per cent and 22 per cent, respectively.

Teachers' Salaries

The present average rate of pay for teachers per hour taught is Cr. 23.50 in primary and Cr. 32.35 in lower secondary education. Our assumptions concerning increased real wages in 1990 correspond to Cr. 60 and Cr. 80 respectively at that time, if the present teaching duties are maintained. Reduced teaching duties would mean an hourly rate of Cr. 74 and Cr. 90 under alternative (I) and Cr. 80 and Cr. 96 under alternative (II).

Teacher salaries for compulsory education in 1990 will amount to Cr. 4,700 million under alternative (I), and Cr. 3,600 million under alternative (II) as compared to about Cr. 800 million today.

Upper Secondary Education

The input of teachers into the "gymnasium" and vocational education is determined by the same main factors as in compulsory education. Hours taught in full class usually amount to 36 per week, and the number of extra hours is relatively small. In the "gymnasium" the class size is about the same as in lower secondary education, while vocational schools often have far smaller classes. Workshop schools, for example, have an average class size of 10 pupils. Teaching duties are on average about 20 hours in the "gymnasium" and 25 hours in vocational schools.

At present the input of hours taught per pupil varies from about 60 hours a year in the "gymnasium", to a maximum of 150 hours a year in certain types of vocational training. The total teacher input amounts to approximately 3 million hours in the "gymnasium" and 5 million hours in vocational schools. The number of teachers is 3,800 and 5,600 respectively.

Future Developments

As in lower secondary education, the introduction of a five-day school week will reduce the number of hours taught in vocational school and the "gymnasium". More free work and new educational aids may lead to a further reduction in the number of hours taught in full class.

More freedom of choice and wider possibilities for combining various subjects, on the other hand, will require a considerable increase in the number of extra hours. The need for strengthening school administration and for teacher retraining points in the same direction.

In the "gymnasium" and the more theoretical forms of vocational training, pedagogical factors may require a reduction in class size. Where classes today are small, on the other hand, there may be scope for better utilisation of teacher resources. The tendency towards integrating various types of education at this level may play a major role in this respect.

Teaching duties are likely to be reduced as a consequence of the introduction of more complex education technologies. This may be of particular importance for vocational training, which also faces increasing qualification requirements for teachers.

In recent years the more theoretical types of education at upper secondary level have expanded more rapidly than those with a clear vocational bias. A structural integration in terms of a comprehensive school at this level may change this tendency. On the other hand, theoretical subjects are likely to be strengthened even in vocationally biased streams, and the general trend towards increased demand for education will push certain parts of vocational training upwards to the post-secondary level.

Choice Alternatives

Upper secondary education also offers a large number of alternatives regarding the allocation of teacher resources and substitution of teachers by other resources. In this context, however, we shall indicate only one alternative for teacher input based on the following assumptions for 1990: 28 hours taught in full class per week, 12 extra hours per week, 18 pupils per class and teaching duties of 20 hours per week. Teachers' wages are assumed to rise as in compulsory education.

This alternative corresponds to an annual input of teachers' time per pupil of 90 hours, and a total input of 17.5 million hours, or an increase in the total teacher input measured in hours of 120 per cent. The number of teachers required will be 22,000 or 150 per cent more than today. Teachers' salaries will amount to Cr. 2,200 million, as compared to Cr. 350 million in 1967.

Post-Secondary Education

In post-secondary education, variations in the number of hours taught is considerable. Hours may amount to 36 per week but in many types of education at this level the number of hours taught is not strictly defined, and in practice is certainly far less. Nor has class size a clear definition in many cases. The number of pupils per teacher varies from about 4 (medicine) to nearly 30 (social science, arts). A common denominator for teaching duties is difficult to find, as such a wide variety of instructional forms are covered.

For illustration purposes we have assumed an average number of "pupil hours" for post-secondary education of 15, a "class size" of 15 pupils, and "teaching duties" of 9 hours per week. This amounts to an annual teacher input of 35 hours per pupil, and a total of 1.1 million hours in post-secondary education. The corresponding number of teachers is 3,500(1).

Future Developments

A five-day week will scarcely influence "pupil hours" in most forms of post-secondary education. A change to less rigid forms of teaching in certain fields of study is likely to be counterbalanced by more organised and intensive instruction in others. Such an equalizing will undoubtedly have to come.

More emphasis will be put on teaching in small groups. At the same time, however, post-secondary education may offer even more possibilities than that at other levels for the use of new media for the simultaneous teaching of large groups of pupils.

Teaching duties are likely to be reduced in most post-secondary education outside the universities.

A break-down of the various types of post-secondary education in the long run is difficult to foresee. It seems likely, however, that there will be a more rapid expansion of the shorter, vocationally-oriented courses at post-secondary level. Furthermore, the most teacher-intensive subjects (medicine, dentistry, technology) are likely to expand less than the average.

We shall not consider in further detail the existing alternatives for the long run allocation of teacher input. The only alternative chosen for 1990 is based on the following assumptions; 15 "pupil hours" a week, 12 pupils per "class", and "teaching duties" of 9 hours per week.

This corresponds to an annual input of teacher time per pupil of 44 hours and a total input of 4.4 million hours, and implies a quadrupling of the number of teaching hours, as compared to the present. The number of teachers required will be 14,000 and teachers' salaries will amount to Cr. 1,600 million, as compared to Cr. 160 million today.

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(1) This corresponds to the actual figure today, assuming 35 weeks of teaching annually.

Total Teacher Input

For all formal education, the main alternative above corresponds to an increase in the total input of teachers' time from 44 million hours in 1967 to 82 million hours in 1990, or 82 per cent. Teachers' time input per pupil will increase from 58 to 82 hours annually, or by 43 per cent.

Of the total increase in teacher input under this alternative, about half is due to the growth in the number of pupils, while the other half is due to higher teacher input per pupil.

The increase in teacher input per pupil does not represent only a raising of educational standards. A different distribution of pupils among the various types of education also influences the total need for teachers. If the 1967 distribution is maintained in 1990, the need for teacher input would be significantly lower than indicated above.

The total need for teachers in 1990 under this alternative amounts to 96,000 as compared to 41,000 today, or an increase of 135 per cent. Teacher salaries amount to Cr. 8,500 million as compared to Cr. 1,500 million today.

Alternative (II)

For purposes of illustration, the above alternative may be compared with one based on the assumptions made in alternative (II) for teacher allocation in compulsory education. A substantially larger input of other educational resources would then be substituted for part of the teacher output required under alternative (I). The input of teachers' time in formal education could then be estimated at 58 million hours, and the number of teachers required at 77,000. This corresponds to a reduction as compared to alternative (I) of 29 per cent and 20 per cent respectively. Teacher costs in alternative (II) would amount to Cr. 6,800 million(1).

7. CONSEQUENCES FOR PUBLIC BUDGETING OF ALTERNATIVES FOR RESOURCE INPUT

The present system of educational financing in Norway can be summarized in this way:

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(1) This alternative for teacher costs corresponds to alternative (IV) in the previous discussion of costs in formal education.

Formal Education

In formal education, practically all the input of teacher and other salaries, purchase of goods and services, research and capital is publicly financed. The input of pupils' time, on the other hand, is predominantly privately financed. Public support covers only about 10 per cent of the costs of this input factor. The rest is financed by the pupils and their families. Private loans do not play a significant role. Pupil contribution is to a great extent in the form of reduced consumption. Studies of the pupil living costs indicate that this factor covers more than half the private share of educational financing.

Alternatives for Distribution of Financial Responsibilities

Our main alternative for future development (alternative A below) is based on the assumption that all resource input, other than that of pupils' time, will also be publicly financed in the future. This cannot, however, be taken for granted. Decisions on this point must be based upon an evaluation of the total level of public subsidies to education and of the special forms of subsidy most appropriate to the objectives adopted for educational policy. In alternatives (B) and (D) we have therefore assumed a certain amount of private financing (10 per cent) of the expenditure of educational institutions(1).

The System of Financing should serve Educational Objectives

Correspondingly, the public share in the financing of pupils' time input should be judged in the light of educational policy aims. Such aims may concern the total demand for education, demand from special social or geographical groups, the efficacy of pupils' time input, the economic dependency of pupils on their families or other private sources of finance etc.

The increase in private income assumed to take place up to 1990 should in itself provide a solid basis for maintaining the private share in the financing of pupils' time input. Willingness to accept financing in the form of reduced consumption may tend to decline possibly as a result of the number of adult pupils, a lowering of the marriage age, and of a general change in the attitude towards limited consumption.

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(1) As private financing of institutional expenditure is unlikely to occur in compulsory education, assumed to include 70 per cent of all pupils, the private share in the financing of voluntary education is much higher than 10 per cent under this alternative.

The distribution of income among social groups will influence the need for public subsidies based on social criteria. One might perhaps expect the need for such subsidies to decline. On the other hand, it should be borne in mind that the present public share in financing is far from sufficient to ensure established policy objectives in this field.

In the future, the efficacy of student input will also constitute a significant argument for public involvement in the financing of pupils' time input. An increasing pressure from grown up pupils for more independence of family and other financial sources may also be expected.

On this background, we have chosen to use one alternative maintaining the present public share in the financing of pupils' time input (alternative A), and one alternative assuming an increase of this share from 10 to 20 per cent (alternative C). The latter assumption is also combined with the assumption of a certain private share in the financing of institutional expenditure in formal education (alternative D). This pattern of financing is well known in many countries, and may provide greater possibilities for the selective use of financial policy instruments.

Combining Alternatives for Financing and for Resource Output

In the table below, the four alternatives for the distribution of financial responsibilities (A - D) are combined with the four alternatives (I - IV) for resource input in formal education outlined above.

Million Cr.

	Public		Private		Total = 100%
1967	3,650	47%	4,100	53%	7,750
I A	14,900	46	17,400	54	32,300
I B	13,400	41	18,900	59	32,300
I C	16,800	52	15,300	48	32,100
I D	15,000	46	17,300	54	32,300
II A	16,500	54	14,000	46	30,500
II B	14,800	49	15,700	51	30,500
II C	18,000	59	12,500	41	30,500
II D	16,500	54	14,000	46	30,500
III A	15,000	52	14,000	48	29,000
III B	13,500	47	15,500	53	29,000
III C	16,500	57	12,500	43	29,000
III D	15,000	52	14,000	48	29,000
IV A	14,000	50	14,000	50	28,000
IV B	12,700	45	15,300	55	28,000
IV C	15,700	56	12,300	44	28,000
IV D	14,200	51	13,800	49	28,000

Most of the alternatives for 1990 show a greater public share in the financing of organised education than at present. However, combinations based on alternatives (III) and (IV), assumed to require smaller resources than alternative (I), may be carried out with a smaller input of public resources, even if the public share in some cases is higher than in alternative (I).

Work-time Education

Total public subsidies to work-time education in Norway are estimated at about Cr. 50 million and are mainly in the form of grants during leave from work, and paid leave for public employees. This corresponds to a public share in the total financing of such education of about 2 per cent.

Pressure for such subsidies as part of an active labour market policy will increase substantially. An expansion in the supply of such education by public educational institutions can be foreseen, and the question of public subsidies to training programmes in enterprises will become more acute.

Three Alternatives for Financing

We have chosen the three following alternatives to illustrate the range of choice regarding the structure for the financing of work-time education.

The first (alternative A) is based on the assumption that the supply of public education of this kind will be expanded to cover 20 per cent of all institutional costs in such education (teacher input, purchase of goods and services and capital). At any time, 1 per cent of the active labour force is assumed to receive grants during retraining.

The second (alternative B) is based on the assumption that all employees are granted the right to retraining, financed by the public at the rate of 75 per cent of the value of pupils' time input. In addition, 50 per cent of the costs of educational programmes in enterprises are assumed to be publicly financed.

The third (alternative C) is based on alternative B, but the financing of educational expenditure by enterprises, the supply of education by public institutions and the input of pupils' time are to be based on a tax levied outside the regular system of public budgets (retraining insurance premium, earmarked tax on enterprises).

These three alternatives for the structure of financing (A - C) are combined with the three previously mentioned alternatives for resource input (I - III) in work time education as shown in following table.

	Public		Private		Total = 100%
	Cr. million	%	Cr. million	%	Cr. million
1967	50	2	2,450	98	2,500
I A	1,750	14	10,750	86	12,500
I B	9,300	75	3,200	25	12,500
I C	0		12,500	100	12,500
II A	1,700	13	10,000	87	11,700
II B	8,200	70	3,500	30	11,700
II C	0		11,700	100	11,700
III A	1,700	14	10,550	86	12,250
III B	7,850	70	3,400	30	11,250
III C	0		11,250	100	11,250

Alternative A, and particularly alternative B, give a far greater public share of the financing as compared with the present situation. This is in fact also true of alternative C, although this is disguised because of a different form of public accounting(1).

The alternatives for resource combination do not differ substantially in terms of the public share in financing. This is explained by the specific alternatives for financing chosen for examination here.

Spare-time Education

Public support for spare-time education today can at most be estimated at Cr. 20 million, mainly in the form of subsidies to adult education courses. In addition, however, is public expenditure on mass media, of which we assume for the purpose of illustration, that Cr. 50 million are spent for educational purposes. The latter is not, however, financed through regular public budgets. In no case does the public share in the financing of spare-time education exceed 1 per cent.

In the future, the public financing of such education will still mostly take the form of institutional costs - education offered by public institutions, subsidies for courses held by private organisations, expansion of public mass media for educational purposes etc. In the latter field major efforts may be expected, even beyond what can be covered by the present system of financing radio and television.

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(1) Consequences for tax policy are also likely to be quite different.

Two Alternatives for Financing

Two alternatives are given below, the first (alternative A) based mainly on the present system of financing, and the second (alternative B) on the development of substantial publicly financed educational activities through the use of mass media, and a wide range of other distance teaching aids.

The two alternatives for financing (A and B) are combined below with the two alternatives for resource input (I and II) indicated above.

	Public		Private		Total = 100%
	Cr. million	%	Cr. million	%	Cr. million
1967	20	0.5	5,480	99.5	5,500
I A	300	1	28,400	99	28,700
I B	600	2	28,100	98	28,700
II A	600	2.5	23,400	97	24,000
II B	1,500	6	22,500	94	24,000

Even the relatively substantial increase in public support, assumed here, still keeps the public share in financing relatively low under all alternatives for 1990. In this case, as well as in formal education and in work-time education, low costs to society coincide with, and in fact depend upon an increased public share in the financing.

Alternatives for the Financing of Total Educational Activities

The combining of the various alternatives for resource input, the structures of financing and the forms of education offers a wide spectrum of alternatives for total public involvement in educational finance by 1990. The highest alternative for public expenditure is Cr. 28,800 million, while the lowest is Cr. 14,700 million(1). Compared to the present situation, the various combinations of alternatives indicate budget increases for educational purposes from 300 per cent to 700 per cent, and the proportion of GNP spent as public support to education between 10 per cent and 20 per cent. The public share of the total financing of education varies between 21 per cent and 43 per cent, while the present share is estimated at 24 per cent(1).

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(1) Disregarding alternatives which assume financing through taxes outside the regular budget.

Financial Consequences of the Distribution Among Forms of Education

In this context, we shall examine the consequences concerning emphasis on different forms of education (I - III) set out above. For the structure of financing, we have used alternative A for formal education and for work-time education, while for spare-time education we have used alternative B in connection with alternatives II and III(2).

	Public		Private		Total = 100%
	Cr. million	%	Cr. million	%	Cr. million
1967	3,750	21	14,000	79	17,750
I	17,000	22	61,500	78	78,500
II	15,000	20	60,000	80	75,000
III	14,800	21	57,200	79	72,000

Both the total public support and the public share in financing are reduced by placing greater emphasis on out-of-school education, and by lowering school admission age, as illustrated by alternatives II and III.

Central Government/Local Authorities

The distribution of financial responsibilities between the central government and local authorities will have to be decided on other than purely fiscal grounds. For the purposes of illustration we shall do no more than indicate the distribution that would occur if in 1990 we still use the present system of financial responsibility. The calculations are based on alternative I above.

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(1) Family education excluded.

(2) For work-time education too we should probably have assumed stronger public participation in the financing in connection with alternatives II and III.

	Central Government		Local Authorities		Total Public=100%
	Cr. million	%	Cr. million	%	Cr. Million
1967	2,050	55	1,700	45	3,700
1990 I	11,800	70	5,200	30	17,000

This marked shift towards central government financing of education is due to an increasing proportion of pupils in those levels of education at present financed by the central government and to the diminishing role of capital input, today mainly covered by local authorities.

Other combinations of alternatives than that illustrated here, would yield an even greater shift towards increased financial responsibilities for central government if the present distribution of financial responsibilities as between central and local government, were maintained in 1990.

III

COMMENTARY: THE SUBSTITUTION OF TEACHER INPUT BY "OTHER RESOURCES" INPUT

by

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My main positive contribution has to do with Dr. Eide's "more favourable" alternative plan for educational development (i.e. the plan in which an input of teachers is substituted by an input of "other resources").

Amongst the most important of these other resources is the gamut of techniques known as "programmed learning" or "teaching technology" (which I take to encompass all uses of teaching machines, CAI teaching group instruction and the like). These methods are characterized by the idea that learning may be usefully controlled (and teaching, after all, is neither more nor less than the control of learning) by an algorithm or a heuristic. This procedure may be executed mechanically or in any other convenient way (for example, by computers with interfaces, as in CAI, via books, by giving instructions to teachers who act, more or less as automata(1) by placing the students in game like situations, etc.) The nature and limitations of this resource deserve further examination.

The possible roles of the "machinery" (in the broadest sense) are quite diverse because there are many facets to the control of learning. In many ways the chief effect of "machinery" upon education should be an upgrading of the teacher. There is really no justification for using teachers as we do at the moment in the capacity of clerks and substitutes for an audio visual presentation (i.e., as readers of notes to students who write them). All of the clerical functions, most of the short-term planning and accounting functions of the teacher can and (from almost any point of view should) be mechanized. Apart from occasional dramatic performances so should the lecturing function be "mechanized" (i.e., relegated to media). The teacher might thus be given an opportunity to function more actively in the following roles; as a private tutor, as a specialist, as a therapist. Apart from that, some teachers may adopt the role of curriculum planners and general innovators.

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(1) Or as arbitrators and umpires in a teaching game, which is a politer way of putting it and may be a more accurate one.

Let us turn, however, to the sort of control procedure that directly interacts with the student. It is essential to take a sufficiently broad view of the procedures available. The familiar question and answer behaviour shaping routine is only one possibility and it is by no means always the most propitious. Other procedures are game directed, group oriented and situation or context oriented. There are also control procedures that organise students to teach themselves.

There are several points, applicable to all control procedures, which of course should be subject to more detailed discussion.

(i) It seems likely that Dr. Eide's proposed investment in control procedures (other resources) will soon be competitive economically. Taking CAI development as an index of the current trend, the system(1) cost per student hour has come down over the past few years from a minimum of $2.50 to about $0.5(2).

(ii) Any effective control procedure must be based upon a model for the learning process. A large number of so called control procedures are not. It is wasteful and stupid to use computing machines as page turners and it is silly (but very easy) to imagine that "having a machine" does anything on its own account. It all depends upon the procedure embodied in the machine.

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(1) For a moderately flexible system with a disply tube and keyboard interface and a local microfiche projector controlled by the computing machine.

(2) Bitzer is citing $0.35 for his system which is the lowest estimate I know of.

(iii) All such control procedures have the effect of breaking down several currently accepted notions about teaching. For example, the process of testing is inseparable from the teaching process and it is quite unnecessary to hold special examinations. Clearly, performance can be recorded as required for evaluation, course design, or obtaining educational statistics. In general, however, the performance variables are internal to the control procedure and their values are not explicitly stated.

(iv) The descriptive model for learning is used to generate a (prescriptive) model for teaching which is incorporated into the system design. Often this must be a fairly elaborate model (on a par with an "artificial intelligence" programme). The requisite level of complexity is just being realized.

(v) There are various basic forms of control procedure depending upon the skill to be taught and it is important to distinguish between them:

(a) Feedforward Procedures including linear and "mathematics" type teaching programmes(1);

(b) Feedback Procedures including "remedially branching" programmes, variable delay cueing systems and the like(2);

(c) Adaptive Procedures (where the model for the student must have its individual parameters estimated);

(d) Conversational procedures (in which man machine discourse takes place at several levels).

(vi) In general it is necessary to recognize that students come equipped with their own "internal teaching machines" (cognitive planning and attention directing systems that are provided with innate learning strategies). In cases (a), (b) and to some extent (c) the control procedure acts as an external surrogate for this "internal system" (i.e., the student's learning strategy is replaced by a teaching strategy). But usually (d) effective teaching entails reaching a compromise between the external and internal teaching strategies.

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(1) Of course, the student receives feedback signals by way of "knowledge of results" but the teaching system receives no feedback from the student.

(2) The feedback is used by the system to modify the material until an educational subgoal is achieved.

(vii) This is true even for quite simple problem solving skills. Some data can be provided.

(viii) Insofar as a control procedure of type (d) is called for the student may be taught how to learn, i.e., to develop learning strategies, learning set, methods of problem exploration, etc. The resulting systems are non trivial. They engage the student in partially co-operative interaction and give rise to a motivating or addictive relationship which is valuable in its own right, i.e. such a system may do better even than a teacher.

Viewed in this light, Dr. Eide's extra resource (control procedures, and their instrumentation, as I am interpreting it) is a complicated entity. Further, its introduction calls for a lot of background work and research (for example, in determining learning models, in determining what kind of control procedure is apposite, etc.). All this is possible but all this is troublesome and perhaps fairly expensive (incidentally, the cost of the research is not fully reflected in the CAI costs quoted).

If the necessary background work can be done (that is, if a policy decision is made that it must be done) then the introduction of control procedures could be positively(1) beneficial, would fill Dr. Eide's resource gap as a substitute, and would not be positively harmful. If the background work were not done but naive control procedures were still used to replace teachers(2) then the substitution could be positively harmful insofar as naive procedures are likely to amplify several of the unfortunate tendencies cited earlier in Dr. Eide's paper.

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(1) Perhaps enormously beneficial as in (viii) it may be possible to achieve genuinely novel sorts of teaching situations.

(2) Naive procedures often aim to replace teachers quite indiscriminately. Not only are they naive in themselves but they are addressed to replacing inappropriate tutorial functions.

IV

THE LONG-TERM DEVELOPMENT OF EDUCATION IN THE NETHERLANDS

by

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I. INTRODUCTION

In this report some trends in long-term development of education and some problems of perspective planning are presented. Its purpose is to provide a starting point for a continuous discussion.

Although perspective planning is not a new issue it has not yet been practised systematically. Few persons are convinced of the need for perspective planning. This need was, however, clearly demonstrated in recent discussions concerning the desirability of opening a new medical faculty. This practical example seems to be so important that we have devoted Section II to it.

Perspective planning in education is impossible without a knowledge of trends in other fields which are discussed in Section III. Sections IV, V, and VI deal with such problems as the future number of pupils, teachers, expenditures, the demand for highly skilled personnel, curricula and educational aids. The consequences of the forecasts for the structure of the educational system are discussed in Section VII.

Finally, we discuss the organisation of planning, perhaps the most important item when talking about perspective planning.

Statistical information for this study has been provided by the Central Bureau of Statistics. Of the education statistics, special mention should be made of:

- De ontwikkeling van het onderwijs in Nederland, 1966, and
- Overgangen binnen het onderwijs en intrede in de maatschappij, 1936, 1956 en 1961-1966, 1967.

II. THE NEED FOR PERSPECTIVE PLANNING: AN EXAMPLE

Not everybody is convinced of the need for perspective planning. In the Netherlands some have been converted to this type of planning in education by a question which arose concerning the demand for and supply of medical doctors(1).

Recently there has been a rush on the medical faculties. Discussion brought out the need either to extend the capacity of medical education (either by increasing the capacity of the existing faculties or by creating a new faculty - costing about 400 million guilders) or to impose a numerus clausus. In these discussions the numerical density of medical doctors (number per thousand inhabitants) played an important part. This density was calculated on the basis of different assumptions concerning the government's admission policy to medical faculties. The supply density thus calculated, was confronted with the demand density in 1980, calculated earlier by an official committee(2).

Concerning the admission policy, two extremes were investigated.

A. An unrestrictive policy: all those who apply are admitted (i.e.) continuation of the existing policy)

A restrictive policy, here two possibilities exist:

B. A given number will be accepted and this number is kept constant over the years.

C. The number admitted will be increased in the course of the year.

The number of freshmen to be admitted under A have been estimated by taking into account the development of grammar-school education and the estimated transfer coefficient of grammar-school certificated leavers to the medical faculties.

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(1) See B.A. Thoolen: Supply of Medical Doctors and Admission Policy; Central Planning Bureau, Reprint series no. 118, 1969.

(2) Demand for and Supply of University Graduates up to 1980; University Council, The Hague, 1968.

Under B, calculations have been made assuming there will be admitted 1400, 1600, 1800, or 2000 freshmen respectively. The lowest number is about the existing capacity of the medical faculties, the highest that of applicants in the present year (1969). Under C, the calculations started on the basis of 1400 freshmen and assumed an increase of 200 freshmen every five years until the number of 2 000 is reached (200 freshmen is about the capacity of a medical faculty in the Netherlands). The numbers of freshmen thus calculated are shown in Graph 1 and Table 1; the numbers graduating are given in Table 2.

The future numbers of doctors and the numerical density of doctors in view of the numbers of freshmen, the existing number of doctors, the death rate, etc., are shown in Table 3.

Table 3 shows that in 1980 the difference between the highest (1.51) and the lowest (1.41 per thousand inhabitants) numerical density of doctors is fairly small (± 10 per cent),

Table 1

NUMBERS OF FRESHMEN IN MEDICAL FACULTIES

	1968	1973	1978	1983	1988	1993	after 1993
A. Unrestricted admission	1850	2050	2350	2700	2800	3200	.
B. Restricted admission (constant numbers admitted)							
1.	1400	.	.	.	.	.	1400
2.	1600	.	.	.	.	.	1600
3.	1800	.	.	.	.	.	1800
4.	2000	.	.	.	.	.	2000
C. Restricted admission (increasing numbers admitted)	1400	1600	1800	2000	2000	2000	2000

Graph 1

NUMBERS OF FRESHMEN IN MEDICAL FACULTIES

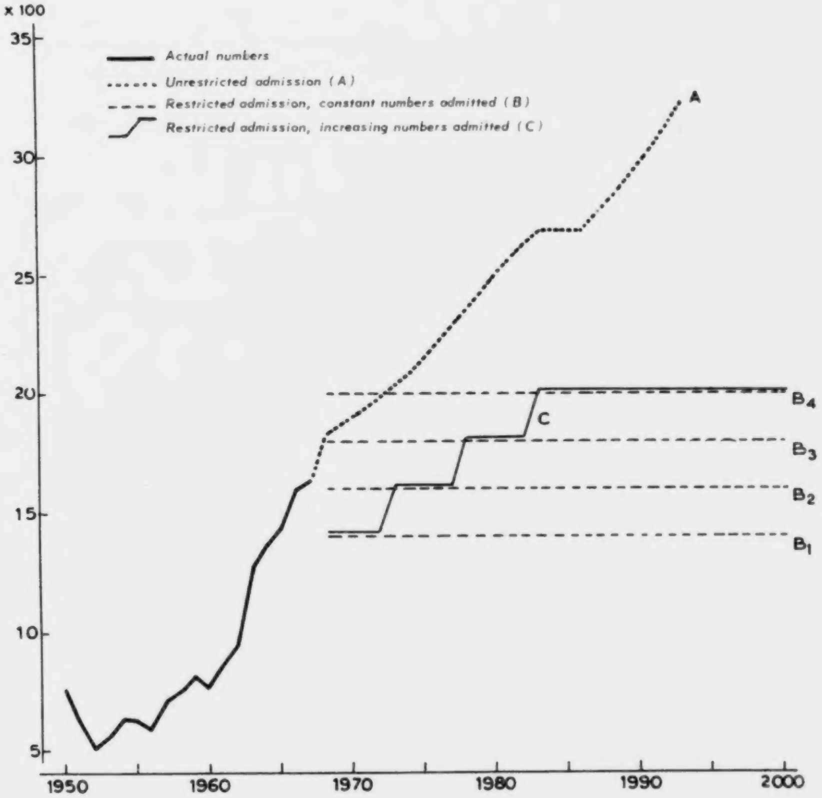

Table 2

NUMBERS GRADUATING IN MEDICAL FACULTIES

	1980	1990	2000
A. Unrestricted admission	1410	1860	2200
B. Restricted admission, 1600 freshmen every year(1)	1170	1170	1170
C. Restricted admission, increasing numbers admitted	1030	1310	1460

(1) Numbers graduating, assuming other numbers of freshmen can be calculated by increasing or decreasing the number of graduates proportionally.

Table 3

NUMBERS OF MEDICAL DOCTORS AND THEIR NUMERICAL DENSITY

	Number of Doctors			Density of Doctors		
	1980	2000	2025	1980	2000	2025
A. Unrestricted admission	21,400	45,400	.	1.49	2.54	.
B. Restricted admission: (constant numbers admitted)						
1. 1400 freshmen	20,300	29,500	31,900	1.41	1.65	1.39
2. 1600 "	20,700	32,700	36,400	1.44	1.83	1.59
3. 1800 "	21,200	35,800	41,000	1.47	2.00	1.79
4. 2000 "	21,700	38,900	45,500	1.51	2.18	1.98
C. Restricted admission (increasing numbers admitted)	20,300	35,000	45,200	1.41	1.95	1.97

notwithstanding the great differences in numbers of freshmen admitted. In later years, the difference becomes larger. The results show (under B) that an additional 200 freshmen (about one new faculty) increases this density in the year 2000 by about 10 per cent. The table shows increasing numbers of doctors even if a constant number of freshmen is admitted(1). This is due to the fact that also the lowest hypothesis assumes a number of freshmen considerably higher than the numbers enrolled in recent years.

If admission is restricted to a constant number of freshmen, then the number of doctors will not continue to grow in the long run. This will be the case when the number of graduates equals the number for replacement due to death and retirement. If, as assumed, the population growth continues, then the density of doctors will go down (as is also shown in Table 3).

The calculations about the supply and numerical density of doctors assuming different admission policies have to be confronted with demand forecasts in order to find out the admission policy which should be adopted. The latest official forecast estimates the required density of doctors at 1.37 in 1980 and 1.40 in 1982 (this means an annual increase in the density of doctors of 1.2 per cent)(2). A glance at Table 3 clearly shows that this demand forecast does not help policy-makers in deciding which admission policy should be adopted. Wide differences in the numbers admitted give rise to small differences in the density of doctors in 1980, and all supply densities are within the boundaries set by a margin of error added to the demand density.

One can, however, compare the latest official estimate of the demand for doctors with international figures, estimates made in other countries and earlier estimates for the Netherlands. Table 4 shows the development in the numerical density of doctors in countries which are more or less comparable to the Netherlands.

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(1) If a constant number of freshmen is admitted (of say 1400) the number of doctors will increase up to 2014 (1967 + 9 years, average length of study + 38 years - average working period of medical doctors). This means that the full consequences of alternative admission policies can be tested only on the very long run.

(2) See Numbers of University Graduates up to 1980, Demand and Supply; University Council, The Hague, 1968.

Table 4
NUMERICAL DENSITY OF DOCTORS, 1950-1963

	Density of doctors		Annual increase per cent
	1950	1963	
West Germany	1.30	1.55	1.1
The United States	1.25	1.45	1.0
Denmark	1.05	1.30	1.9
Norway	1.05	1.25	1.5
Italy	1.00	1.40	2.4
Canada	1.00	1.15	0.9
Belgium	0.95	1.35	3.1
Australia	0.95	1.35	3.0
France	0.90	1.15	1.9
United Kingdom	0.85	1.20	2.4
The Netherlands	0.85	1.10	2.2
Sweden	0.70	1.05	3.1

Source: World Health Organisation.

As the Table 4 shows, there is a correlation between the numerical density of doctors and the increase in this density; generally speaking the increase was highest in those countries where the density was lowest.

When the Dutch estimates are judged on the basis of the information presented in Table 4, then one has to conclude that, notwithstanding a low numerical density in the base year (i.e. 1.11 in 1962) an increase in demand has been assumed (1.2 per cent annually) which is considerably lower than for the years prior to 1962 (2.2 per cent, the period 1950 - 1962 still being characterized by shortages of medical doctors) and also lower than is implied by the international relation between actual density and increase in density. Estimates may also be compared with those recently published for England and Sweden. According to the estimate in the Report of the Royal Commission on Medical Education 1965-1968 (HMSO, London 1968) the numerical density of doctors needs to be increased from 1.18 in 1965 to 1.48 in 1980 and 1.80 in 1995, or by 1.3 per cent annually. In Sweden, with a density of 1.10 in 1968 the target is 2.20 in 1985 (an increase of 4 per cent per year)(1).

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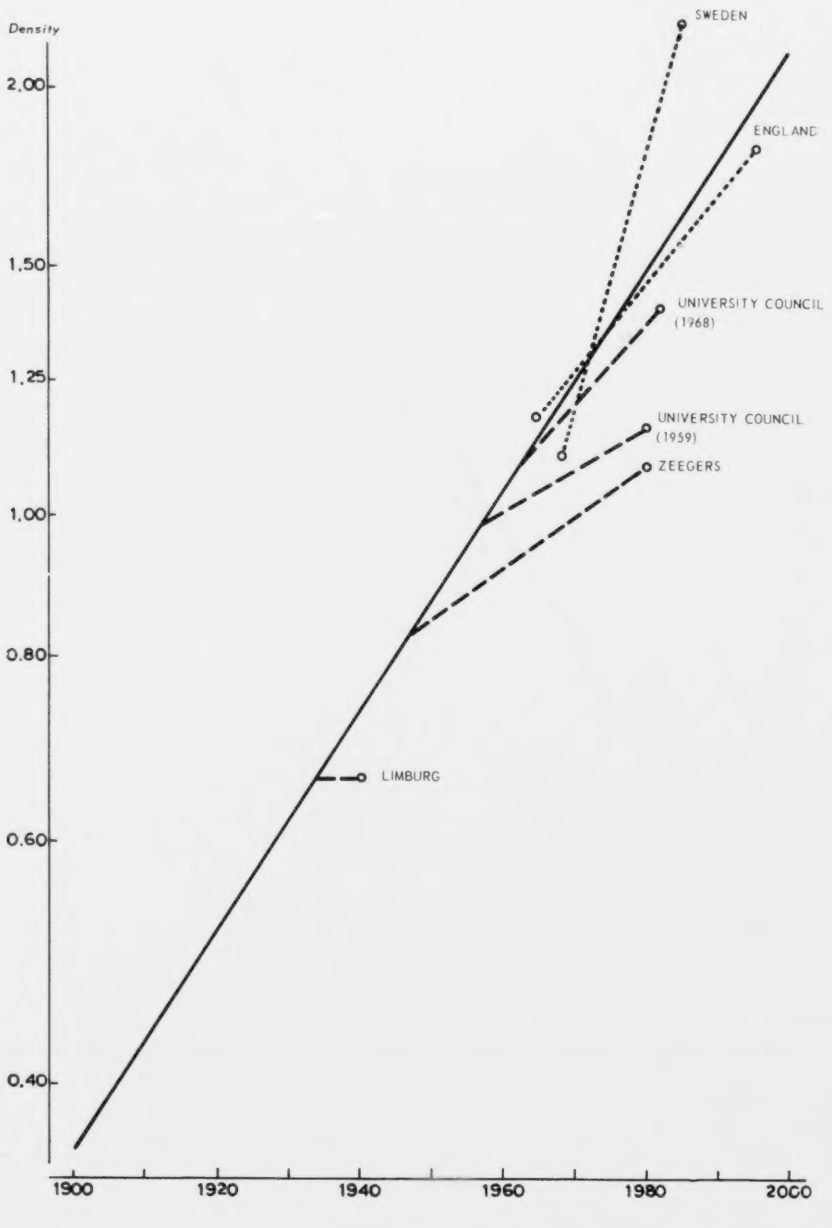
(1) Dr. Gunnar Wenström: "A New Medical and Technical School in Sweden"; World Medical Journal, 15th May, 1968.

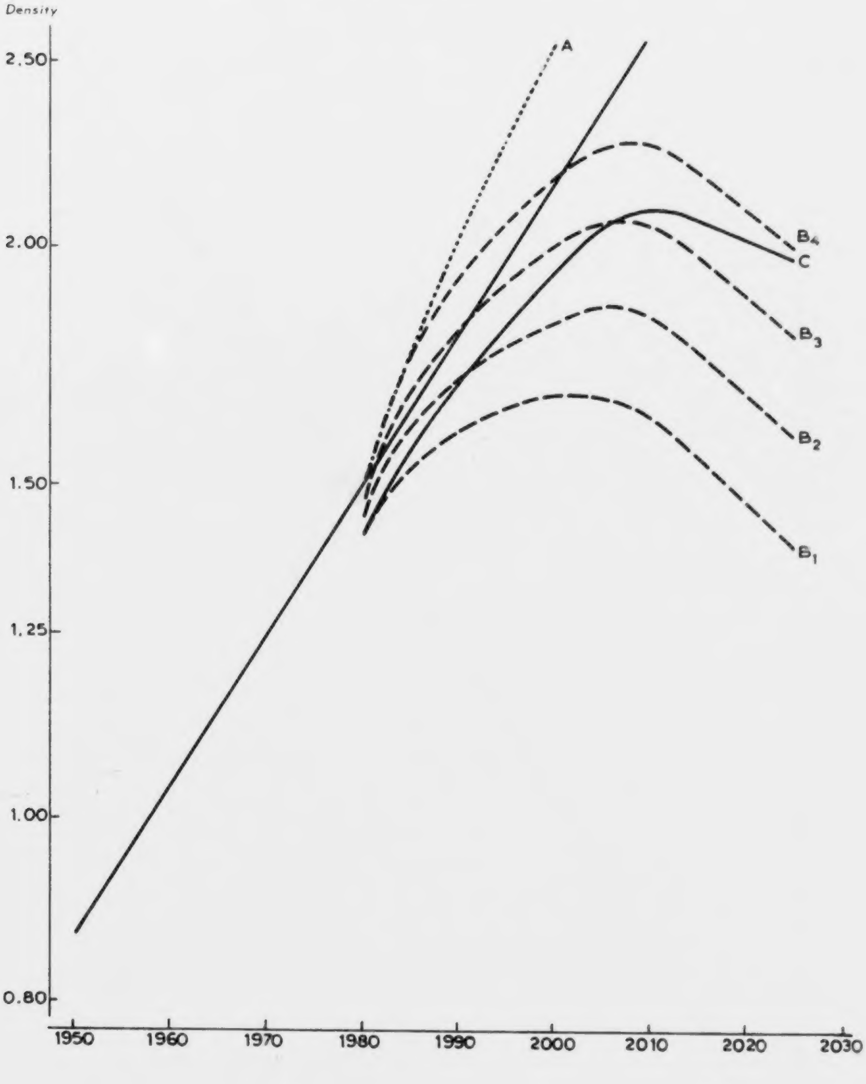
Graph 2

ACTUAL AND ESTIMATED REQUIRED NUMERICAL DENSITIES OF MEDICAL DOCTORS



Graph 3

DENSITY OF MEDICAL DOCTORS, ACTUAL, TREND AND FUTURE SUPPLY DENSITIES
(Assuming different admission policies)



The results of these and some older Dutch forecasts(1) are shown in Graph 2 and are compared with the long-term development of the numerical density of doctors (increase of about 1.8 per cent annually). The graph shows that earlier estimates were always too low; those for 1980 had to be revised upwards regularly. The recent forecast and the English forecast are somewhat below the trend and that of Sweden is well above. Keeping this in mind, it is not unrealistic to take the trend as indicative for the future required density.

In Graph 3 the densities reached by assuming different admission policies are compared with this trend. The graph shows first of all that, assuming a certain margin of error, none of the different policies can be rejected on the basis of a comparison for 1980. For 2000, the admission policies which would accept only 1400 (B1) or 1600 (B2) freshmen in the years to come have to be rejected. The policy admitting 1800, or that admitting an increasing number of freshmen results in too low a density, especially for the years after 1990. Even accepting 2000 freshmen annually would not lead to very unrealistic densities. The unrestrictive policy has to be rejected unless one accepts the Swedish forecast of required density.

The graph clearly shows that a policy in which the number of admissions increases, closely follows the trend, even if at too low a level. This implies that a realistic solution to the admission problem (and therefore to that of expanding the capacity of medical faculties) has to be found in a regular increase of this capacity, starting with a capacity of 1600 freshmen (200 more than actual capacity).

This somewhat lengthy analysis shows that a solution to the admission problem could be found only by taking a very long-term view and thus demonstrates the necessity of perspective planning.

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(1) (a) Commissie ter Bestudering van de toenemende bevolking van universiteiten en hogescholen: *De toekomst der academisch gegradueerden* (The future of the university graduated), Groningen, 1936 (*Report Limburg*);
(b) G.H.L. Zeegers, A.Oldendorff en W.R. Heere: *Artsenbehoefte en artsenvoorziening 1952-1982* (Demand and supply of medical doctors), The Hague, 1951 (*Report Zeegers*);
(c) Interuniversitair Contactorgaan: *De ontwikkeling van het aantal academici tot 1980, aanbod en behoefte*; (The Development of the Numbers of University Graduates up to 1980, Supply and Demand), Zeist, 1959 (University Council 1959);
(d) *Numbers of University Graduates up to 1980, Demand and Supply*, University Council, The Hague, 1968.

III. GENERAL TRENDS

Introduction

Speculation about the long-term development of education is possible only with the long-term development trends of society as a background. Unfortunately these trends are not yet studied systematically and scientifically, the available material being long term-population forecasts, a survey of possible economic growth, and a long-term view on physical planning of the Netherlands. In addition to these forecasts or plans made by public agencies, private organisations are busy in this field, namely the so-called "Werkgroep 2000" and the "Stichting Toekomstbeeld der Techniek". The "Werkgroep 2000" disperses its activities in many directions, the "Stichting" concentrates on future development of technology. These private organisations, however, have not yet produced studies which can be used as reference for plotting the required development in education.

The main element which is lacking in the Dutch organisation of long term planning is an institution dealing with long-term macro-sociological trends. This may be due to the fact that after the war sociology in the Netherlands was influenced to a great extent by American sociology, with its emphasis on micro studies, especially of adaptation problems.

In view of the present position of Dutch involvement in long-term forecasting we have to restrict ourselves mainly to a description of demographic development, various economic trends and a survey of trends in physical planning.

Demographic development

The Netherlands with 380 inhabitants per square kilometre, is among the countries with a very high population density. This is perhaps one of the reasons why population forecasts attract so much attention. It is not only the consequences for educational expansion and for economic policy which compel us to take a close watch at the future development of the population, but also those for physical planning.

From 1950-1965 the population increase was about 1.4 per cent per annum, notwithstanding a continuous fall in the birth rate which reached the lowest pre-war level in 1965. The official forecast made in 1965, assuming a continuing but moderate decrease in the birthrate estimated the population in 2000 at 19-20 million(1). Since the publication of the forecast, a drastic change in the birthrate has occurred so that the estimated population had to be revised. The latest forecast (1967) foresees a population of about 18 million in 2000(2), which would mean a density of 530 inhabitants per square kilometre.

This is the estimate which has been used in this paper as a basis for forecasts in the fields of education, manpower and economics. How weak this basis really is, has been demonstrated by experience. The change in population forecasts which were made necessary by developments taking place in 2 years have already required a revision of the medium term plan for the expansion of pre-primary education.

In Table 5 the results of this population forecast are compared with the 1965 figures.

Table 5

POPULATION 1965-2000

Age	Numbers (in millions)			per cent		
	1965	1980	2000	1965	1980	2000
0 - 5	1.45	1.58	1.94	12	11	11
6 - 13	1.80	1.91	2.43	14	13	14
14 - 24	2.32	2.58	3.02	19	18	17
25 - 64	5.55	6.70	8.43	45	47	47
≥ 65	1.18	1.60	2.08	10	11	11
Total	12.30	14.37	17.90	100	100	100

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(1) Central Bureau of Statistics, Maandstatistiek van de Bevolking en Volksgezondheid, February, 1965

(2) Idem, April, 1967.

The long-term trend in the age distribution is not spectacular: a small decrease in the percentage of youngsters and some increase in that of elderly people. Much more important is the total increase in numbers and its effect on education, economic development and physical planning.

Economic trends

Some time ago a survey was made on future long term economic development(1). This has been used as a starting point for the case presented here, but was slightly revised downwards as the population forecast of 18 million in 2000 was accepted as a basis of the economic forecast and not the earlier one of 21 million.

One of the determinants of possible economic growth is the increasing labour force resulting from an increasing population. In estimating the future labour force trend, changes in education and labour participation rates were taken into account. The results are shown in Table 6.

Table 6

LABOUR FORCE, 1965-2000

	1965	1980	2000
Labour force participation rates			
Males age			
14 - 19	50	19	5
20 - 24	89	82	74
25 - 49	98	98	99
50 - 64	91	92	94
≥ 65	15	10	4.5
Females			
14 - 19	51	21	10
20 - 24	55	55	56
25 - 49	18	22	28
50 - 64	14	14	15
≥ 65	2.2	2	1.5
1. Total labour force (millions)	4.57	5.10	6.15
2. Total population (millions)	12.30	14.40	17.90
1. as a percentage of 2.	37	36	34

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(1) Prof. C.A. van den Beld: "De Nederlandse economie in het jaar 2000", in Nederlandse Maatschappij voor Nijverheid en Handel, Haarlem, 1967.

As the table 6 shows, decreasing labour force participation rates are expected for the younger age groups (a consequence of increasing participation in education) and for the older age groups. There is an important increase in the participation rate for (married) women, partly as a consequence of their increasingly high level of educational attainment. Despite the somewhat more favourable population structure, total participation is falling, namely from 37 per cent in 1965 to 34 per cent in 2000, meaning that a smaller proportion has to support the inactive part of the population.

Total production cannot be estimated by multiplying future labour force by future labour productivity estimated by trend extrapolation. Growth of labour productivity shows an acceleration which cannot continue forever. If one divides the period 1860-1965 into three each of 35 years, then the average growth in labour productivity was respectively 0.5, 1.5 and 2.5 per cent per annum. During recent years 3 or 3.5 per cent was recorded. This increase is due to a rising investment ratio, and it is unlikely that this ratio will rise continuously. When instead of extrapolating labour productivity a growth model is applied, GNP in 2000 can be estimated at 3.5 times that of 1965. Average real wage would increase from about Guilders 9,000 in 1965 to about Guilders 22,000 in 2000, corresponding to a level of consumption some 15 per cent higher than that prevailing in the United States today and to a decrease in working hours from 43 to 38 hours per week. Employment can be estimated as follows if total production is broken down into sectors and future sector productivity taken into account:

Table 7 shows better than any other where future economic growth possibilities exist. A slowly increasing demand for agricultural products combined with increasing productivity expels labour force from agriculture and the food and textile industries. Real growth industries are the chemical and the metal industries (and especially metallurgy). The particularly favourable location of these industries in the so-called golden Meuse-Rhine delta may even cause actual growth to be higher than that foreseen in Table 7. Increasing income per capita, and a slow increase in productivity will provide greater employment possibilities in construction and services.

Table 7

EMPLOYMENT BY BRANCH OF ACTIVITY, 1965-2000

	Millions	
	1965	2000
Agriculture and fishing	0.39	0.24
Food and beverages	0.21	0.18
Textile, clothing and footwear	0.22	0.17
Chemicals	0.10	0.18
Metal	0.56	0.85
Electricity, etc.	0.10	0.06
Other manufacturing	0.27	0.35
Construction	0.47	0.61
Services	1.73	2.76
Government	0.52	.75
Total	4.57	6.15

Table 8

GOVERNMENT EXPENDITURES, 1965 - 2000

(Millions of guilders, constant prices)

	Amount		per cent	
	1965	2000	1965	2000
Education	4,300	23,000	22.3	30.0
Traffic and transport	1,050	2,000	5.4	2.6
Open-air recreation	30	900	0.2	1.2
Town reconstruction	60	3,000	0.4	3.9
Water supply facilities	210	300	1.1	0.4
Protection of physical environment	..	900	..	1.2
Income transfers	2,110	9,600	10.9	12.6
Subsidies	600	0	3.1	0
Aid to developing countries	240	4,800	1.2	6.3
Defense	2,600	3,600	13.4	4.7
Other expenditures	8,100	28,400	42.0	37.1
Total expenditures	19,300	76,500	100	100
Total as per cent of GNP	28	32		

The manpower forecasts give some indications as to required shifts in education.

The economic forecasts imply increasing government expenditures which are mostly complementary to private consumption (roads, recreation facilities) or to production (protection of physical environment, investment in manpower, i.e. education). Rough estimates of future government expenditures are shown in Table 8.

The estimate for educational expenditure is based on forecasts of the number of pupils, teachers' salaries etc., and will be dealt with in greater detail later.

Total government expenditures as a percentage of GNP show a considerable increase mainly due to the increase in educational expenditures. Experience shows that such important increase in this percentage can be achieved only during disasters (World War I, pre-war depression, World War II). Is the educational explosion a comparable disaster?

Trends in physical planning

It can be expected that Dutch society will have to face increasingly difficult problems of physical planning. Until recently economic and physical planners were thinking in terms of economic advantages of agglomeration, for example, in Rotterdam, were the biggest port in the world was created after the war. Favourable physical location conditions, an adequately educated and trained labour force, and an appropriate infrastructure stimulated economic development in the western part of the country and especially of such industries as petrochemics, metallurgy, banking, insurance, and trade. Shortages of labour supply were overcome by migrants and commuters from the other less densely populated areas of the country.

This development has met increasing opposition. Generally speaking, growing prosperity may be said to have brought to light the social costs of growth. In the western part of the country complaints about air and water pollution, shortage of recreation facilities and traffic jams are becoming louder. Other parts of the country lay increasing stress on their right to get an equal share of economic growth. Workers are showing growing resistance to migration and claim that the government should be responsible for bringing factories to the workers and not the reverse.

In 1966 the government published a report in which the goals for physical planning were elaborated(1). The main goals are shown to be a more even distribution of population over the country and a reduction in regional income disparities. The targets for the first goal are shown in Table 9.

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(1) Tweede nota over de ruimtelijke ordening, The Hague, 1966.

Table 9

ACTUAL ESTIMATED AND TARGET DISTRIBUTION OF POPULATION

Millions

Region	1965	2000	
		Estimate	Target
North	1.3	2.25	3.00
East	2.2	4.00	4.25
West + South	8.5	13.25	11.50
South-West	0.3	0.50	0.75
New polders	-	-	0.50
Total	12.3	20.00	20.00

The continuation of existing trends would lead as the table 9 shows to a population of 13.25 million inhabitants in the South and West regions. The target for 2000 is 11.50 million, the difference being a target migration of 1 million to North and East and one of 0.75 million to the South West and the new polders(1). The change in migration streams which this target implies can be accomplished only if the second target reduction in regional income disparities is reached. The instruments used in this respect are improvement of the infrastructure and an active policy of industrialisation. This policy will lead to an increasing demand for highly qualified personnel in the backward regions and a rapid expansion of educational facilities in these regions will therefore be required. The universities in particular are regarded as being an essential element in the improvements of the infrastructure of the backward regions. In discussions on the distribution of new universities throughout the country, this argument plays an important role.

In the physical planning policy of government much attention is also given to combating increasing air and water pollution and to creating optimum physical structures for (smaller and bigger) regions.

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(1) These targets are based on an expected population of 20 million in 2000, and have not yet been revised on the basis of the lower population forecast. To bring about a more even distribution of population over the country still remains one of the major goals in physical planning.

For many regions physical plans, made by the regions and tested by central government, exist already and within a relative short time the whole country will be covered by such plans for the future physical structure of the Netherlands.

All the activities of local and central governments in this type of planning will create sizeable demand for such specialized personnel as traffic and communications experts, physical planners, landscape architects, experts in air and water pollution etc., for which new educational facilities must be created or existing ones expanded.

Summary and conclusion

Up to now, perspective forecasting and planning has not led to a coherent picture of future developments to serve as a solid basis for plotting long-term trends in the field of education. Nevertheless, some important conclusions can be drawn from existing information. It may be expected that demographic trends and growing prosperity will create an ever increasing social demand for education. In 2000, the standard of living will be higher in the Netherlands than that in the United States today. Growing numbers of pupils may be expected and, assuming that the "standard of living" in education follows the same trend as that of society, rapidly increasing expenditures on education may also be foreseen.

Economic forecasts expect growing employment in the chemical industry, metal industry (metallurgy) and services. If education has to meet manpower requirements, it should produce increasing numbers of skilled workers for these sectors. Economic forecasts also indicate a reduction in working hours and a consequent increase in leisure time. Although the increase in leisure time should not be exaggerated, it seems necessary that school curricula should reflect the growing importance of preparing youngsters for better utilisation of future leisure time.

Economic growth is accompanied by ever-increasing social costs: air and water pollution, traffic jams, noise. Research and therefore also education, will have to play an important role in combating these syndromes of highly industrialised societies. Education will also become a pivotal instrument in stimulating economic development in backward regions. This implies an educational policy in which emphasis is put on an equal distribution of educational facilities over the country.

The economic forecasts foresee a society in which research and technology are dominant factors. Education has up till recently shown an ever widening technological gap with society. Before this becomes really fatal it will be necessary to introduce technology in the educational process.

Sociological trends are more important for education than are those for demography, the economy, physical planning or technology. One of the most important is perhaps that towards fundamental democratization. Education will have to prepare youngsters for a society which much more than that of today, will be characterized by the self-determination and responsibility of individuals in all kinds of organisations, groups and institutions. The education system will be able to fulfil this task only by a fundamental democratization of the very system.

IV. NUMBERS OF PUPILS, NUMBERS OF TEACHERS AND EXPENDITURES IN EDUCATION

General

One may conclude when considering existing methods and practices for forecasting the short-term development in numbers of pupils that in principle, everywhere the same methods are applied. This is not the case, however, regarding long-term forecasts. Experience in this field is scarce and one realizes that especially here alternative approaches are possible. This is the reason why, when getting global ideas about future numbers of pupils, four different approaches were used. The first takes as its starting point the existing school system (including the reorganisation to which government has committed itself) and the at present foreseeable trends in the flow of pupils through this system. The second approach is based on an extrapolation of trends in participation rates per age group. In this approach it is implicitly assumed that the education system will so adapt itself as not to throw up any barrier in absorbing the increasing number of pupils. Earlier attempts to analyse the underlying factors determining the participation in some types of schools revealed the overwhelming influence of social stratification(1). This is taken into account in the third approach which gives an estimate of the future number of pupils, assuming a complete democratization of participation in the higher levels of education in the year 2000. The last approach uses the findings of an international analysis to forecast the future number of pupils in the Netherlands. In this sequence the methods shows an increasing sophistication and it may be assumed that actual numbers of pupils will be in between the upper and lower limits thus set.

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(1) See e.g. R. Ruiter: "The Past and Future Inflow of Students into the Upper Levels of Education in the Netherlands" in Social Objectives in Educational Planning, OECD, 1967.

Flow of pupils through the educational system

A systematic survey of the flow of pupils through the educational system can be obtained by means of an education matrix. This matrix shows where pupils (by sex, type of school and grade) go and where they come from. It distinguishes repeaters, passers (to a higher grade in the same type of school or to another school) and leavers (e.g. to society). The matrix is completed by showing the flow of children from society to the education system, especially those 4 and 5 years old who join the nursery schools, and 6 years old entering primary education and not having attended a nursery school.

A strongly condensed matrix is presented in Table 10. For reasons of space, breakdowns by sex and grade have been abolished, and various types of technical and vocational education have been compressed into three levels: junior, senior, and higher technical and vocational education. The various agricultural and horticultural schools (at three levels) have been put into one category. One sees reading the rows from left to right, where 1964 pupils were in 1965; and reading vertically, the composition of 1965 pupils (origin) in the various types of schools.

The table shows that the number of pupils increased by 53.1 thousand (± 2 per cent), due to an excess of new entrants (258.6 thousand) over leavers (205.5 thousand). Of the leavers 98.7 thousand left with a diploma and 106.8 without. Of the 1965 pupils in primary education 212.8 thousand came from nursery schools, 1166.5 thousand were already enrolled in primary education in 1964, some 1.5 thousand came from special primary schools, while 28.2 thousand went to school for the first time.

If for each row the 1965 figures are expressed as portions of the corresponding 1964 number, a matrix of transfer coefficients is obtained. An analysis of these coefficients over time shows, generally speaking, no systematic change in pass ratios from one grade to another in the same type of school or in the repeaters ratios. Important changes occurred in the transfer ratios from one type of school to another and which, in most cases, coincides with a decrease in the transfer to society. As examples, the transfer coefficients of the sixth

Table 10

NUMBER OF PUPILS IN FULL TIME EDUCATION 1964 and 1965

Thousands

		1964	1965											School-leavers		
			NS	PS	SS	CS	SMS	GS	JVE	SVE	MVE	AE	HE	with diploma	without diploma	
Nursery school	NS	446,8	233,5	212,8											0,5	
Primary school	PS	1397,8		1166,5	10,7	18,0	68,3	39,6	81,3	0,1		3,4		4,4	5,5	
Special school	SS	60,8		1,5	48,7	0,3	0,3	0,1	2,4			0,1			7,4	
Continuation school	CS	38,9			0,1	18,1	2,2	0,8	3,0	0,2		0,1			14,4	
Secondary modern school	SMS	276,2				1,3	199,0	7,4	8,6	10,7	7,4	1,5		18,1	22,2	
Grammar school	GS	202,2				0,1	4,8	162,2	0,8	2,8	5,4	0,5	11,2	6,2	8,2	
Junior vocational education	JVE	237,7				1,1	0,5	0	148,8	14,0	0	0,1		33,0	40,2	
Senior " "	SVE	47,7					0,1	0,1	0,1	25,2	2,2			19,2	0,8	
Higher " "	HVE	48,9								0,2	36,1		0,3	9,3	3,0	
Agricultural education	AE	23,9							0,1			17,2		4,5	2,1	
University	HE	58,4									0,1		51,8	4,0	2,5	
Stock 1964		2839,3														2839,3
Entrants			223,6	28,2	3,3	0,1	0,6	1,1	0,2	0,2	0,2	-	1,1			258,6
Leavers														98,7	106,8	205,5
Stock 1965			457,1	1409,0	62,8	39,0	275,8	211,3	245,3	53,4	51,4	22,9	64,4			2892,4

Table 11

TRANSFER COEFFICIENTS, GRADE SIX OF PRIMARY EDUCATION

From grade six to:	Male						Female					
	1961	1962	1963	1964	1965	1966	1961	1962	1963	1964	1965	1966
Special primary school	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Primary school, grade 6	0,08	0,06	0,06	0,05	0,04	0,04	0,05	0,05	0,04	0,03	0,03	0,03
Continuation school	0,09	0,09	0,08	0,07	0,07	0,06	0,11	0,11	0,11	0,10	0,10	0,09
Secondary modern school	0,28	0,28	0,28	0,29	0,28	0,29	0,32	0,32	0,33	0,33	0,33	0,34
Grammar school	0,15	0,16	0,17	0,18	0,19	0,19	0,12	0,13	0,14	0,15	0,17	0,17
Junior technical school	0,30	0,31	0,32	0,33	0,35	0,35	0,00	0,00	0,00	0,00	0,00	0,00
Junior domestic science school							0,36	0,36	0,36	0,36	0,35	0,35
Apprenticeship system	0.01	0.01	0.01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Retail trade school	0.01	0.01	0,01	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
Junior agricultural school	0,04	0,04	0,04	0,03	0,03	0,03	0,00	0,00	0,00	0,00	0,00	0,00
Vocational training, part time	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
Commercial college, part time	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Nautical school	0,01	0,01	0,01	0,01	0,01	0,00						
Society	0,03	0,03	0,02	0,02	0,02	0,01	0,03	0,02	0,01	0,02	0,01	0,01
Total	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Number of pupils grade of six (x 1000)	126	119	116	114	113	112	118	112	110	109	109	107

grade of primary education, of leavers from secondary modern schools (language section) and grammar schools (science sections) will be discussed in some detail.

As Table 11 shows, the sixth-graders of primary education are increasingly keen on entering grammar schools or junior technical schools (boys), the proportion of repeaters has gone down and the transfer rate to continuation schools, junior agricultural schools and to society has decreased.

Table 12 shows that an increasing number of secondary modern school-certificated leavers wish to continue their education in grammar schools. The transfer to senior technical schools (boys), senior domestic-science schools (girls) and teacher-training colleges for nursery schools increased, accompanied by a decrease in the transfer to teacher-training colleges for primary schools and to society.

The transfer of grammar school leavers (science section) to universities is increasing and to society decreasing (Table 13).

To assess the future number of pupils in the various types of schools (and breakdowns by sex) the following model was used:

$$P_{ij}^{t} = o_{v}^{t} P_{ij}^{t-1} + o_{w}^{t} P_{i(j-1)}^{t-1} + o_{x}^{t} P_{kl}^{t-1} + o_{y}^{t} D_{h}^{t-1} + o_{z}^{t} C_{g}^{t} ,$$

$$P_{i}^{t} = \sum_{j} P_{ij}^{t} ,$$

$$D_{h}^{t-1} = o_{d}^{t-1} P_{hm}^{t-1} ,$$

in which:

P^{t} = number of pupils in year t,

C_{g}^{t} = numbers in cohort g in year t,

i, k = type of school (i,k = 1...38),

j, l, m = grade,

D_{h} = certified leavers from type of school/grade h(h = 1..41),

o_{v}, o_{w}, o_{x}, o_{y}, o_{z} = transfer coefficients,

o_{d} = graduation rate.

In all, 38 different types of schools were distinguished, with a total of 163 grades and 41 kinds of certificated leavers.

In the first equation the terms stand for: repeaters, passers from a lower grade of the same type of school, new-comers from another type of school without diploma, new-comers from another type of school where they received a diploma, and new pupils coming from society. The coefficients of the first four terms form together the matrix of transfer coefficients mentioned above.

With the use of the model two kinds of forecasts were made. In the first the various transfer coefficients were kept constant at their 1965 level. The resulting number of pupils would be those who would enrol if a restrictive admission policy were adopted by educational policy-makers. In the second forecast, changing transfer coefficients were used. The future coefficients were assessed by making use of the outcomes of time-series and cross-section analysis(1). A full account of this analysis cannot be given here, although an example, may prove enlightening. Table 11 shows that nearly all primary school leavers go on to secondary schools. In view of the factors determining participation in grammar school education, the transfer coefficient to grammar school may be expected to continue to increase. This implies that transfer coefficients to other types of education will decrease. In the short term the percentage of repeaters of sixth grade primary education, and of transfers to continuation schools and junior agricultural schools may go down. As the lowest possible level will soon be reached (see Table 11) the transfer coefficients of the two other major types of secondary education (secondary modern education and junior technical education) will go down. Instead of increasing transfer coefficients for these types of schools as has been the case up to now (see Graph 4), decreasing percentages may be expected.

The outcome of the forecasts are shown in Table 14.

As the table shows, the number of pupils will increase by more than a million between 1965 and 2000, even when only demographic trends and pipe-line effects are taken into account. A decrease in repetition rates and in drop-out coefficients

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(1) See e.g. R. Ruiter, op cit.

Table 12

TRANSFER COEFFICIENTS, GRADUATES OF SECONDARY MODERN SCHOOLS

With certificate to:	Male						Female					
	1961	1962	1963	1964	1965	1966	1961	1962	1963	1964	1965	1966
Secondary modern school	0.05	0.05	0.05	0.07	0.06	0.07	0.00	0.00	0.01	0.01	0.01	0.01
Grammar school grade 2 - 3	0.07	0.08	0.09	0.11	0.12	0.11	0.01	0.01	0.01	0.01	0.02	0.01
grade 4	0.02	0.02	0.02	0.03	0.04	0.04	0.02	0.03	0.04	0.04	0.05	0.05
Junior technical school	0.01	0.01	0.01	0.01	0.01	0.01	-	0.00	0.00	0.00	0.00	0.00
Apprenticeship system	0.02	0.03	0.02	0.02	0.03	0.02	-	0.00	-	0.00	-	-
Retail trade school	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Vocational training, part time	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Senior technical school	0.08	0.08	0.09	0.10	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00
Senior agricultural school	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Commercial college, part time	0.11	0.10	0.10	0.10	0.10	0.10	0.06	0.04	0.04	0.03	0.03	0.03
Senior domestic science school							0.13	0.14	0.16	0.16	0.17	0.19
Art college	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
Social workers training college	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nursery teachers' training college							0.06	0.09	0.11	0.12	0.13	0.13
Nautical college	0.04	0.03	0.03	0.03	0.03	0.03						
Teachers' training college	0.15	0.15	0.15	0.14	0.15	0.16	0.11	0.10	0.10	0.09	0.09	0.08
Other education	0.02	0.02	0.03	0.02	0.02	0.05	0.03	0.01	0.02	0.02	0.01	0.03
Society	0.39	0.39	0.36	0.31	0.26	0.23	0.57	0.57	0.51	0.51	0.48	0.46
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of graduates (x 1000)	12.4	14.1	16.2	17.4	17.1	17.0	14.2	16.4	18.3	19.3	19.7	19.8

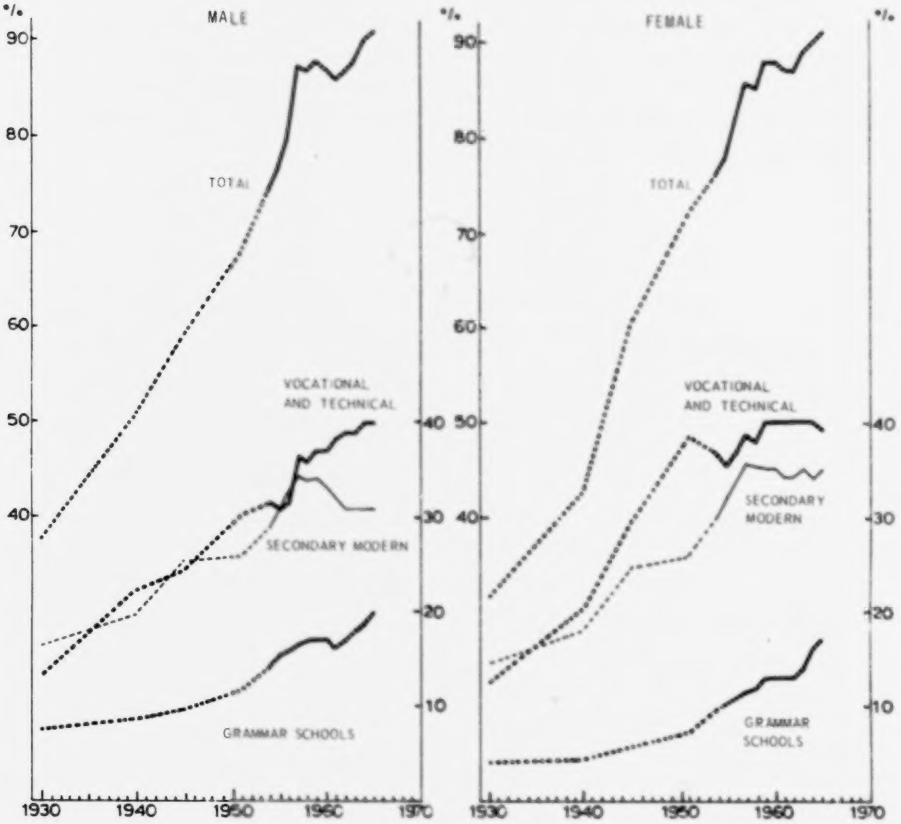
Table 13

TRANSFER COEFFICIENTS, CERTIFICATED LEAVERS FROM GRAMMAR SCHOOLS (SCIENCE SECTION)

With certificate to:	Male						Female					
	1961	1962	1963	1964	1965	1966	1961	1962	1963	1964	1965	1966
Senior domestic science school							0.04	0.04	0.04	0.05	0.05	0.05
Technical college	0.15	0.16	0.17	0.14	0.15	0.16	0.04	0.03	0.02	0.03	0.03	0.04
Agricultural college	0.01	0.01	0.01	0.01	0.01	0.01	0.00	-	-	0.00	0.00	0.00
Art college	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.02
Social workers' training college	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.03	0.04	0.03	0.04
Technical college, part time	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.03
Nautical college	0.02	0.01	0.01	0.01	0.01	0.01						
Teachers' training college	0.02	0.02	0.02	0.02	0.02	0.02	0.08	0.08	0.11	0.08	0.07	0.07
University	0.59	0.67	0.63	0.70	0.73	0.66	0.34	0.42	0.41	0.47	0.49	0.44
Other education	0.03	0.03	0.02	0.04	0.03	0.01	0.02	0.04	0.01	0.03	0.04	0.03
Society	0.17	0.08	0.12	0.06	0.03	0.10	0.43	0.33	0.36	0.29	0.27	0.28
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of graduates (x 1000)	4.9	4.7	5.6	6.2	6.2	7.2	0.9	0.8	0.9	1.1	1.2	1.4

Graph 4

NUMBER OF FIRST ADMISSIONS TO THE FIRST YEAR OF FULL-TIME SECONDARY EDUCATION AS A PERCENTAGE OF THE 12 YEAR-OLD POPULATION



and an increase in the transfer rate to higher types of schools (i.e. increasing participation in education) will add roughly speaking another million pupils. Expansion is particularly rapid in the prestige schools, i.e. grammar schools and universities. In vocational education one may note the same trend. Pupils attending junior vocational schools increasingly want to continue their education at a higher level (semi and higher vocational education). This will result in vastly increasing numbers of highly skilled workers.

Table 14

BREAKDOWN OF PUPILS BY TYPE OF FULL-TIME EDUCATION, 1965-2000

thousands

	1965	1980		2000	
	Actual	Constant coefficients	Changing coefficients	Constant coefficients	Changing coefficients
Nursery schools	447	496	625	610	785
Primary schools	1398	1492	1475	1905	1835
Special primary schools	61	70	79	88	124
Secondary modern schools	276	300	283	363	295
Grammar schools	202	253	347	303	625
Junior vocational educaion(1)	294	333	362	406	494
Senior vocational education(2)	52	72	114	84	233
Higher vocational education(3)	51	69	85	81	149
University education	58	120	145	140	286
	2839	3205	3515	3980	4826

(1) Including continuation schools and junior agricultural schools.

(2) Including senior agricultural education.

(3) Including higher agricultural education.

Extrapolation of enrolment ratios

In the preceding section a forecast of future numbers of pupils was given assuming that the education system would remain as it is today. This, however, is most unlikely and therefore another approach seems justified. Past figures show a continuous growth in enrolment as a percentage of age group. Extrapolation of these enrolment percentages has been used here to forecast future numbers of pupils. Four main levels of education were distinguished: pre-primary, primary, secondary and university education. In this breakdown, secondary education is composed of heterogenous elements: it contains all types of education from primary to university.

Table 15 and Graph 5 show the numbers of pupils in the past and those estimated for 1980 and 2000.

According to these estimates the number of pupils in pre-primary and primary education will be roughly 40 per cent higher than in 1965, for secondary education it will be more than 100 per cent and for university education more than 300 per cent. In pre-primary and primary education the increase is due mainly to increasing numbers in the age groups concerned; in secondary education increasing participation plays a more important role than growing population, and in university education all increasing participation which causes the numbers of students to grow.

These forecasts are based on trend extrapolation of enrolment ratios for the various cohorts. For young people of 14 or more the picture is shown in Graph 6, and suggests that all the 14,15,16,17 and 18 year olds will successively participate in secondary education. As soon as the 100 per cent is reached no further increase is possible; this explains the slacking off of participation growth in secondary education as shown in Graph 5.

The forecasts lead to some simple but very important conclusions:

1. between 1950 and 1965 educational facilities were created for about 0.8 million pupils; between 1965 and 1980 similar facilities must be provided for another 0.8 million and between 1980 and 2000 for 1.2 million;

Table 15

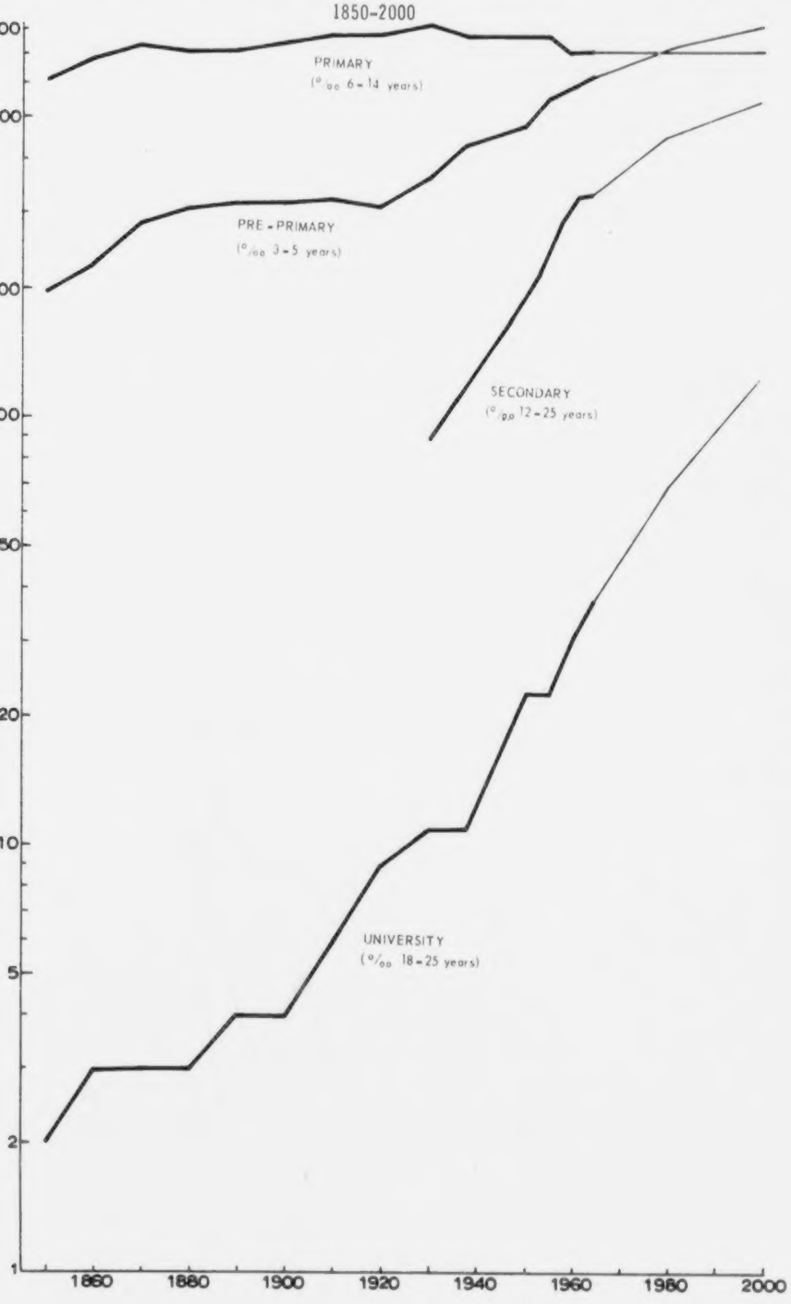
NUMBERS OF PUPILS IN FULL-TIME EDUCATION, POPULATION PER AGE GROUP, AND ENROLMENT EXPRESSED AS PERCENTAGE OF AGE GROUP, 1850-2000

Thousands

	1850	1900	1930	1950	1965	1980	2000
Pupils							
pre-primary education (1)	40	118	179	342	457	640	760
primary education(2)	369	740	1192	1249	1472	1550	1960
secondary education (3)	.	.	180	444	899	1340	1890
university education (4)	1	3	12	30	64	130	275
total (5)	.	.	1563	2065	2892	3660	4885
Population per age group							
3 - 5 years (6)	205	372	491	720	718	880	950
6 - 14 " (7)	604	994	1431	1582	2031	2150	2720
12 - 25 " (8)			2026	2328	2952	3270	3860
18 - 25 " (9)	443	718	1133	1290	1606	1830	2120
total population(10)			7,900	10,100	12,300	14,400	17,900
Enrolment expressed as a percentage of age group							
pre-primary education (1 and 6)	19	32	36	47	64	73	80
primary education (2 and 7)	61	75	83	79	72	72	72
secondary education (3 and 8)	.	.	9	19	30	41	49
university education(4 and 9)	0.2	0.4	1.1	2.3	4.0	7	13
total full-time education (5 and 10)			20	20	23,5	25,5	27

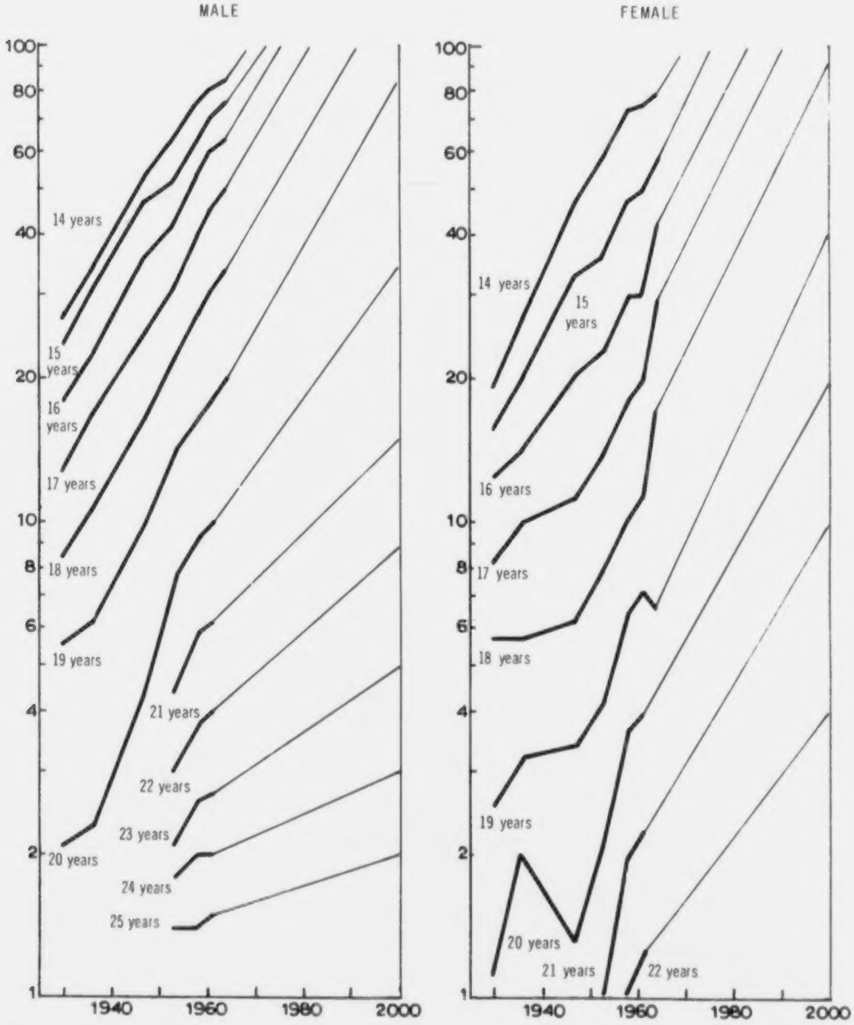
Graph 5

ENROLMENT IN EDUCATION AS A ‰ OF POPULATION, PER AGE-GROUP, 1850-2000



Graph 6

ENROLMENT IN FULL-TIME EDUCATION, AS A PERCENTAGE OF POPULATION PER AGE, 1930-2000



2. Graph 6 suggests the need for a continuous lengthening of compulsory education. If it is assumed that this will be felt to be necessary when 80 per cent of males (voluntarily) undertake education, then an extension of the compulsory age to 18 years can be expected by 1980, and to 20 years by 2000;
3. the number of students in university education will become so large that a re-organisation of the university system (still more or less the same as it was 100 years ago) will be inevitable.

Democratization of participation in education

There are great disparities in the participation in secondary and university education per social class(1). Table 16 summarizes some statistical findings.

Table 16

BREAKDOWN OF POPULATION AND STUDENTS IN SECONDARY AND UNIVERSITY EDUCATION BY SOCIAL CLASS, 1965

	Population			Secondary education		University education	
	Total	12-25 years	18-25 years	Number of students	Participation rate(a)	Number of students	Participation rate(b)
	%	'000	'000	'000	%	'000	%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Higher	5	148	80	99	66	31	39
Middle	30	885	482	431	48	28	6
Lower	65	1919	1044	369	19	5	0.5
Total	100	2952	1606	899	30	64	4.0

(a) as a percentage of (3).

(b) as a percentage of (4).

---

(1) In the two other levels, primary education and pre-primary education, participation per social class is respectively either equal or almost equal. These two types have apparently been fully democratized.

For both secondary and university education we have made two estimates for 2000. Both assume a change in the social class distribution; one forecast assumes constant (1965) participation rates per social class, and the other participation rates per social class equal to those of the higher social class in 1965(1). Realization of the latter forecast would imply full democratization of participation in education in 2000. For secondary education the findings are presented in Table 17.

Table 17

BREAKDOWN OF POPULATION AND STUDENTS IN SECONDARY EDUCATION BY SOCIAL CLASS, 2000

Social class	Population		No further democratization		100% democratization	
	Total	12 - 25 years	Participation rate(a)	Number of students	Participation rate	Number of students
	%	'000	%	'000	%	'000
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Higher	15	580	66	380	66	380
Middle	45	1740	48	830	66	1150
Lower	40	1540	19	290	66	1020
Total	100	3860	39	1500	66	2550

(a) See column 6 of Table 16.

The estimated social class distribution in 2000 differs widely from that in 1965. To estimate the 2000 distribution it was assumed that the percentage of the higher class will grow at the same rate as the percentage of university-trained personnel in the labour force. Notwithstanding the rapid expansion of middle-level types of education (Table 14), the middle social class will not increase at the same rate as the higher class. An important reason for this is that the so-called "old middle class" (retailers, farmers, artisans and owners of small industrial enterprises) is dying out.

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(1) The raison d'être for this forecast is of course the great emphasis which today is put on democratization of education.

On the basis of a changing social class distribution one may expect the participation rate in secondary education to rise from 30 in 1965 to 39 in 2000. A comparison between Table 15 and Table 16 shows that the trend extrapolation shown in Table 15 and which results in a participation rate of 49 per cent in 2000, implies a major step towards full democratization of participation in education. Complete democratization would result in a participation rate of 66 per cent or an additional 17 per cent of students in secondary education.

University education provides the following picture:

Table 18

BREAKDOWN OF POPULATION AND STUDENTS IN UNIVERSITY EDUCATION BY SOCIAL CLASS, 2000

Social class	Population		No further democratization		100% democratization	
	Total	18 - 25 years	Participation rate(a)	Number of students	Participation rate	Number of students
	%	'000	%	'000	%	'000
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Higher	15	320	39	125	39	125
Middle	45	950	6	57	39	370
Lower	40	850	0.5	4	39	330
Total	100	2120	8.8	186	39	825

(a) See column 8 of Table 16.

On the basis of a changing social class distribution, a doubling of the participation in university education may be expected. A comparison with the corresponding figure in Table 15 indicates that the trend extrapolation, shown there implicitily assumes a further democratization of university education. Full democratization of university education by 2000 seems an unrealistic target.

International comparison

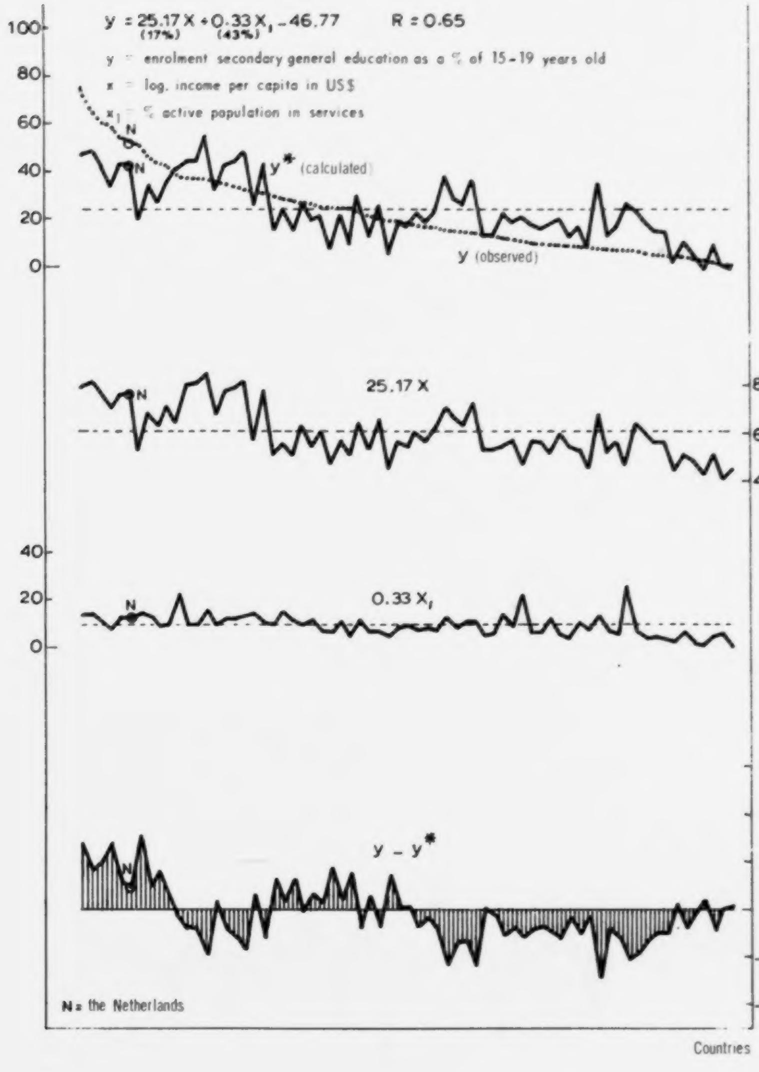
A fourth attempt to estimate the future number of students in the Netherlands is based on international comparison, which can be made in different ways. The method used here is to try to analyse by means of multiple regression analysis the quantitative effect of the factors determining participation in education. This analysis can be restricted to secondary and university education, as primary education is compulsory and participation in it is about 100 per cent of what can be expected. For 1960 an attempt has been made to explain participation in secondary and higher education in 70 countries. (i.e. all countries in the world for which adequate statistical information was available) by such factors as: income per capita, the distribution of labour force over the three major economic sectors (agriculture, industry, services) and the rate of urbanization (percentage of population living in towns of 20,000 or more inhabitants, and 100,000 or more inhabitants). It may be assumed that these factors measure the major economic and social disparities between the countries included in the analysis.

The findings of the analysis are not very encouraging, Of the many attempts made, the combinations of factors which give the best results are shown in Graphs 7 to 10. One of the findings of the analysis was that the rate of urbanization does not help explain differences in enrolment rates between countries. A similar conclusion could be drawn from a regional analysis of differences in school enrolment ratios in the Netherlands. In the international analysis (as in the Dutch regional analysis) income per capita plays a dominant role. Besides income per capita, the percentage of labour force in industry as compared to services may provide an additional contribution to the explanation.

The position of the Netherlands in the graphs indicates that participation in the various types of education is larger than might be expected on the basis of the relations which hold for all the countries included in the analysis. This is particularly true for vocational education. In the Netherlands are too many pupils in the secondary education streamed into technical and vocational education?

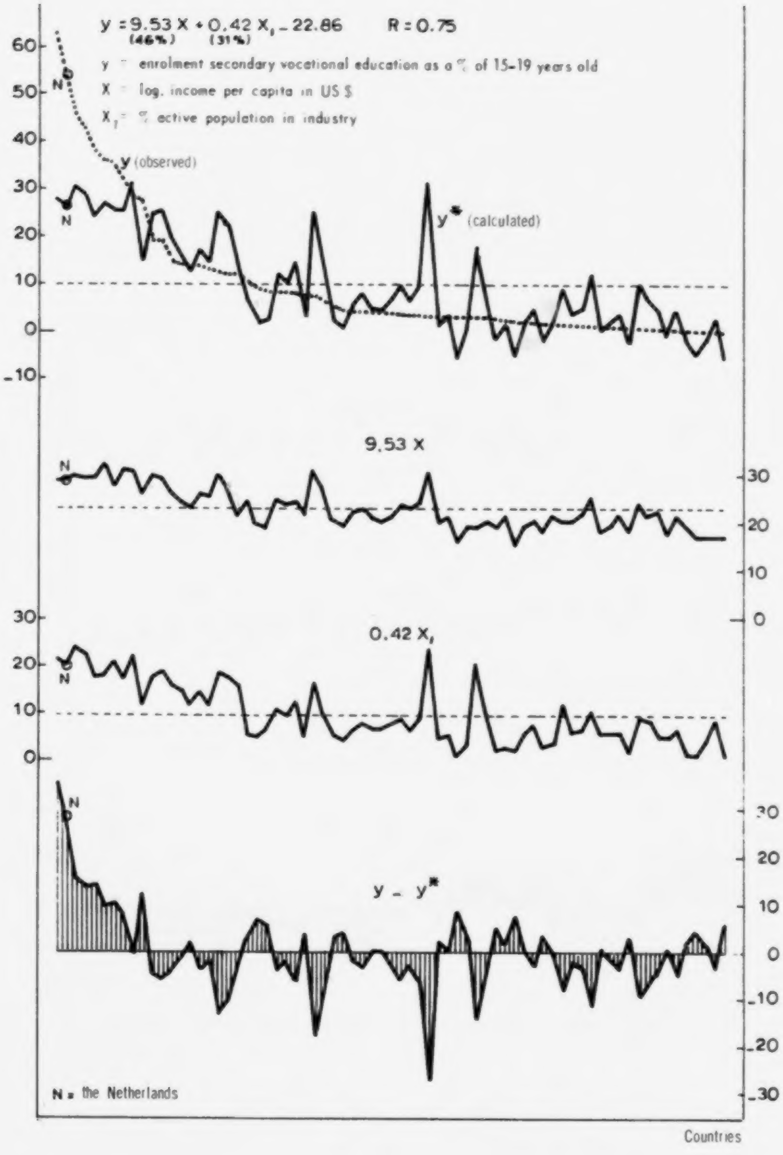
Graph 7

ENROLMENT RATIOS SECONDARY GENERAL EDUCATION AND SOCIAL CHARACTERISTICS, 69 COUNTRIES, 1960



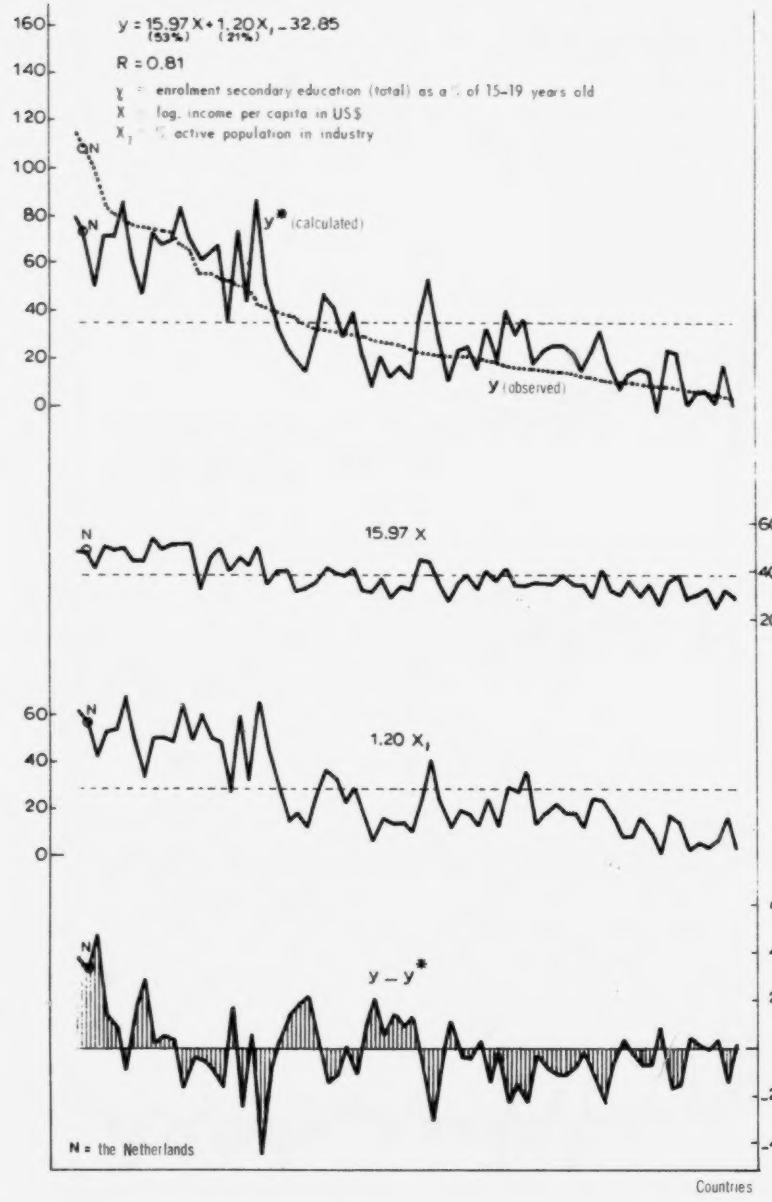
Graph 8

ENROLMENT RATIOS SECONDARY VOCATIONAL EDUCATION AND SOCIAL CHARACTERISTICS, 71 COUNTRIES, 1960



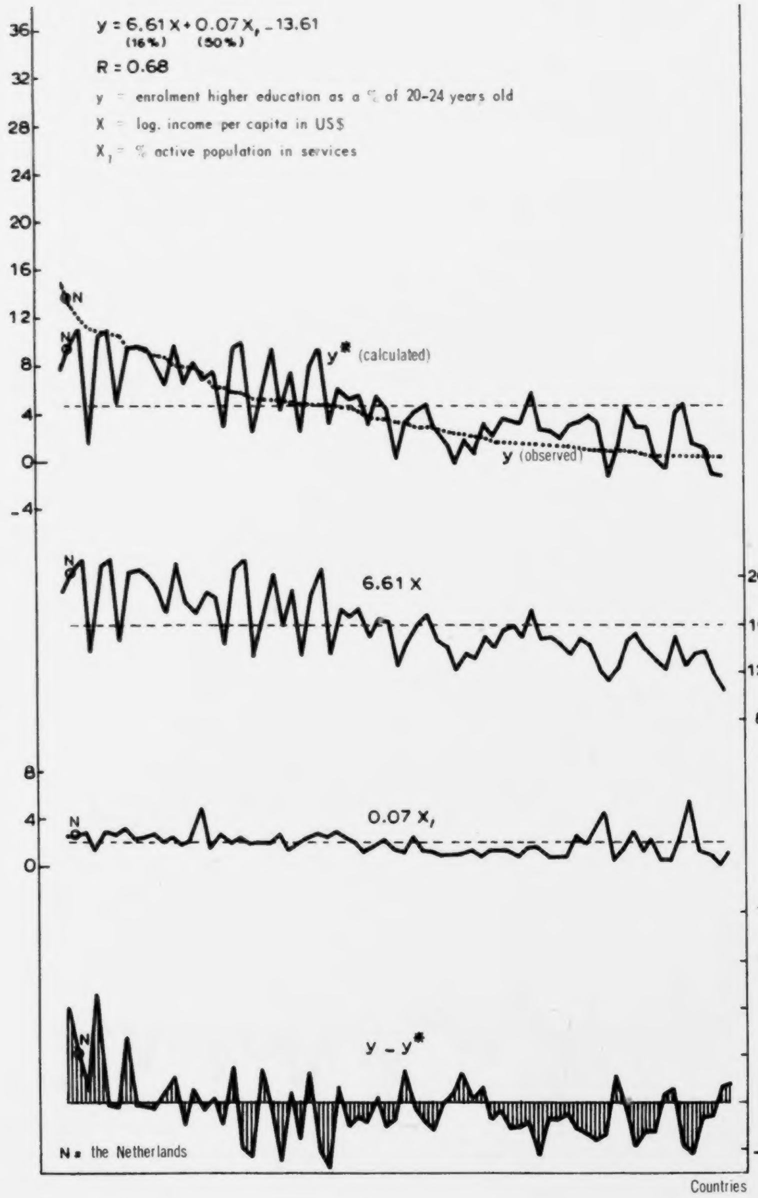
Graph 9

ENROLMENT RATIOS SECONDARY EDUCATION (TOTAL)
AND SOCIAL CHARACTERISTICS, 70 COUNTRIES, 1960



Graph 10

ENROLMENT RATIOS HIGHER EDUCATION AND SOCIAL CHARACTERISTICS, 70 COUNTRIES, 1960



An estimate of future enrolment in the Netherlands on the basis of the international analysis and taking into account the forecasts of income per capita, etc., shows the following enrolment figures:

secondary education	2,000,000
university education	130,000(1)

The forecast for secondary education is more or less in line with the above forecasts. That for university education is extremely low. Does this signify that enrolment in university education is much more determined by other factors than income per capita?

Comparison of the various forecasts

A comparison of the different forecasts shows:

Table 19

NUMBER OF PUPILS BY TYPE OF FULL-TIME EDUCATION, IN 2000

Thousands

Type of education	Flow method (a)	Extrapolation of participation trends	100% democratization	International comparison
Pre-primary	785	760	760	(760)
Primary	1959	1960	1960	(1960)
Secondary	1796	1890	2550	2000
University	286	275	825	130
Total	4826	4885	6095	4850

(a) Changing co-efficients.

The differences in the forecasted numbers of pupils in pre-primary and primary education are negligible. Larger differences occur in the number of pupils in secondary education. Nevertheless the different forecasts show about the same order of magnitude with wide differences in the number of students to be expected in university education. This reflects the difficulties of planning the future expansion of university education.

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(1) In the analysis, post-secondary and university education have been taken together for statistical reasons. The forecast has been corrected to allow figures for university education to be obtained.

Participation in education: a comparison between participation (as forecast) in the Netherlands and that in the United States

The forecasts of the development of participation in education in the Netherlands can be compared with what has taken place in the United States, where a high level has been reached for some time.

This comparison has been given in Graph 11 for the age groups 14-17 years, 18-19 years and 20-24 years respectively. As the United States figures covered both full-time and part-time education the forecasts for participation in full-time education in the Netherlands have been increased by the estimated participation in part-time education.

The Netherlands show an estimated back-log in participation of 35 years for the 14-17 year olds (35 years ago the participation rates for this age group in the United States was the same as in the Netherlands today). For the 18-19 year olds, the back-log is 8 years and for the 20-24 year olds 4 years. According to our estimates participation rates in the Netherlands will reach the United States level between 1970 and 1975. The level of income per capita in the Netherlands will reach that of the United States much later, say about 1990.

Number of teachers

Table 20 gives some information about the number of teachers. The number required in the future is based on the number of pupils estimated by trend extrapolation of enrolment rates (see Table 15). Once the future number of pupils has been estimated the required number of teachers will depend on the future pupil/teacher ratios. The pupil/teacher ratios which have been used, are those now being requested by the various organisations of teachers.

Graph 11

ENROLMENT IN FULL-TIME AND PART-TIME EDUCATION AS A PERCENTAGE OF POPULATION PER AGE GROUP, THE NETHERLANDS AND USA

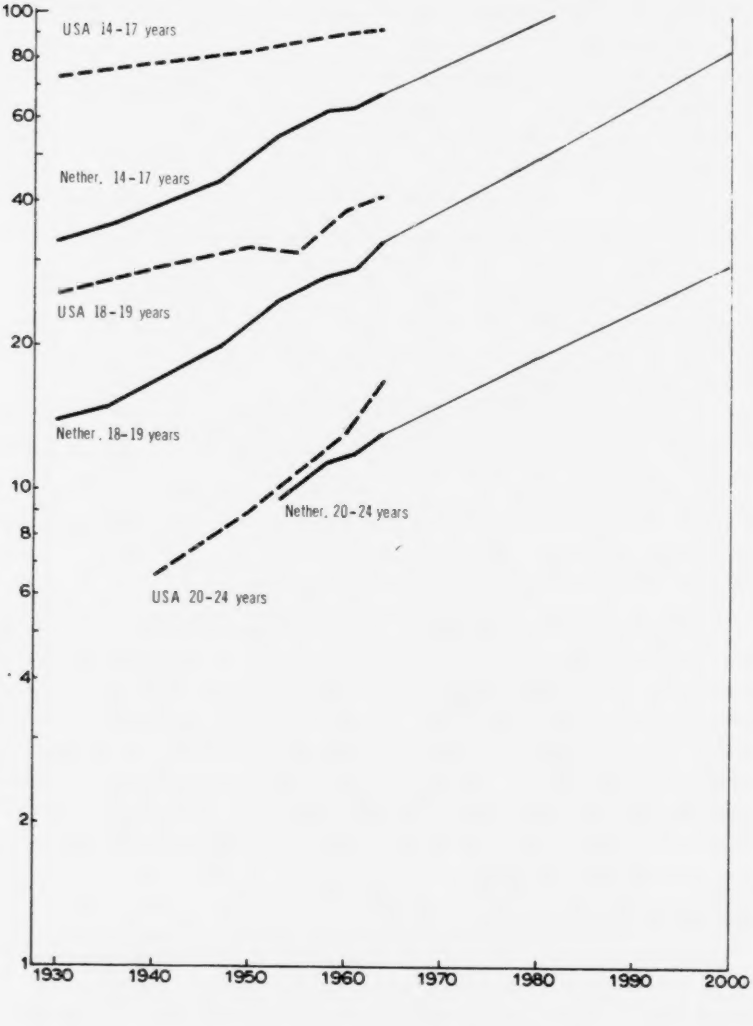

Table 20

ACTUAL AND REQUIRED NUMBER OF TEACHERS, 1930-2000

thousands

	1930	1950	1960	1965	1980	2000
Number of teachers						
pre-primary education	4.7	8.3	11.5	13.6	21	25
Primary education	36.8	36.6	45.5	49.7	62	78
secondary education	19.0	26.0	53.0	60.0	94	126
university education(1)	.	.	.	21.5	43	92
Total	.	.	.	144.8	220	321
Pupil teacher ratios						
pre-primary education	38	41	34	34	30	30
primary education	32	34	32	30	25	25
secondary education	15	17	16	15	15	15
university education(2)	.	.	.	3	3	3
Total labour force				4,570	5,100	6,150
Teachers as a percentage of labour force				3,2	4,3	5,2

(1) Teaching personnel and other personnel.

(2) Number of students to total number of personnel.

The number of teachers will increase considerably according to these forecasts, and also as a percentage of the labour force. According to these assessments more people will find employment in education in 2000 than today in agriculture. One wonders, however, to what extent these required numbers will be met by the supply of teachers. In the postwar period there have always been shortages of teachers at various levels. Can it be expected that the fastly growing demand for teachers in the future can be satisfied?

Expenditures on Education

The estimates of the future number of teachers (Table 20) have been taken as a starting point to calculate expenditure on education. It has been assumed that real salary per teacher will increase at the same rate as salaries outside the educational system i.e. by 2.5 per cent per annum, and that, in the long run, total personnel expenditure constitutes 60-65 per cent of total expenditures on education.

Table 21 and Graph 12 show the result of our calculations.

Table 21

PUBLIC EXPENDITURE ON EDUCATION, 1900-2000(a)

Thousand million guilders

	1900	1930	1938	1950	1965	1980	2000
Expenditure(1)	0.03	0.26	0.20	0.56	4.2	9.2	24
GNP(2)	2.0	6.8	5.9	19	69	110	240
(1) as a percentage of (2)	1.3	3.7	3.3	3.0	6.1	8.4	10

(a) 1900-1965 current prices; 1980 and 2000, 1965 guilders.

Graph 12 shows that 4 periods can be distinguished in the development of public expenditure on education as a percentage of GNP. From 1900-1915 a moderate increase in the percentage can be observed. During the period 1915 to about 1930, the percentage grows very fast, falls from 1930-1938 and shows a rapid increase in the postwar period(1). The long-term forecosts imply an increase in line with the long-term development in the past. It is reassuring to consider the development of public expenditure on education in this way. If, however, we look at the development of expenditure on other items also, e.g. medical care(2), it becomes rather frightening. In 2000 we would spend about 20 per cent of GNP on such simple things as education and medical care. If other rapidly expanding items of expenditure are also included, one wonders what will be left for private consumption in the year 2000.

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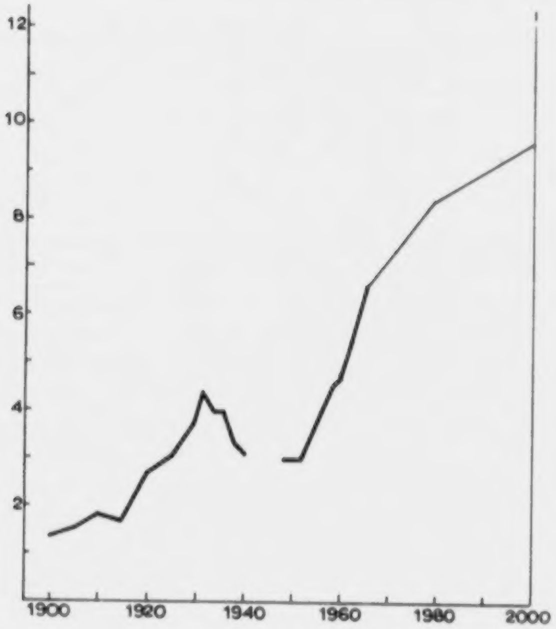
(1) For a more detailed analysis of past development of educational expenditure, see J. Passnier and R. Ruiter. "Expenditures on Education in the Netherlands", O.E.C.D., 1969.

(2) See "De gezondheidszorg, Internationaal bezien", Maandschrift Central Bureau of Statistics, May 1968.

Graph 12

GOVERNMENT EXPENDITURE ON EDUCATION, AS A PERCENTAGE OF GROSS NATIONAL PRODUCT, 1900-2000



V. SUPPLY OF. AND DEMAND FOR HIGHLY SKILLED PERSONNEL

The forecasts of the number of pupils in the various types of education imply a rapidly increasing number of highly skilled workers. It is not possible to say whether these numbers can be absorbed by the labour market. Demand calculations have been restricted mostly to university graduates and go no farther than 1980. Nevertheless it seems appropriate to have a look into existing information.

For university graduates, Table 22 summarizes the findings of the latest demand/supply forecasts(1). The supply forecast is based on the forecast of the number of students as shown in Table 14.

Table 22

SUPPLY OF AND DEMAND FOR UNIVERSITY-TRAINED PERSONNEL

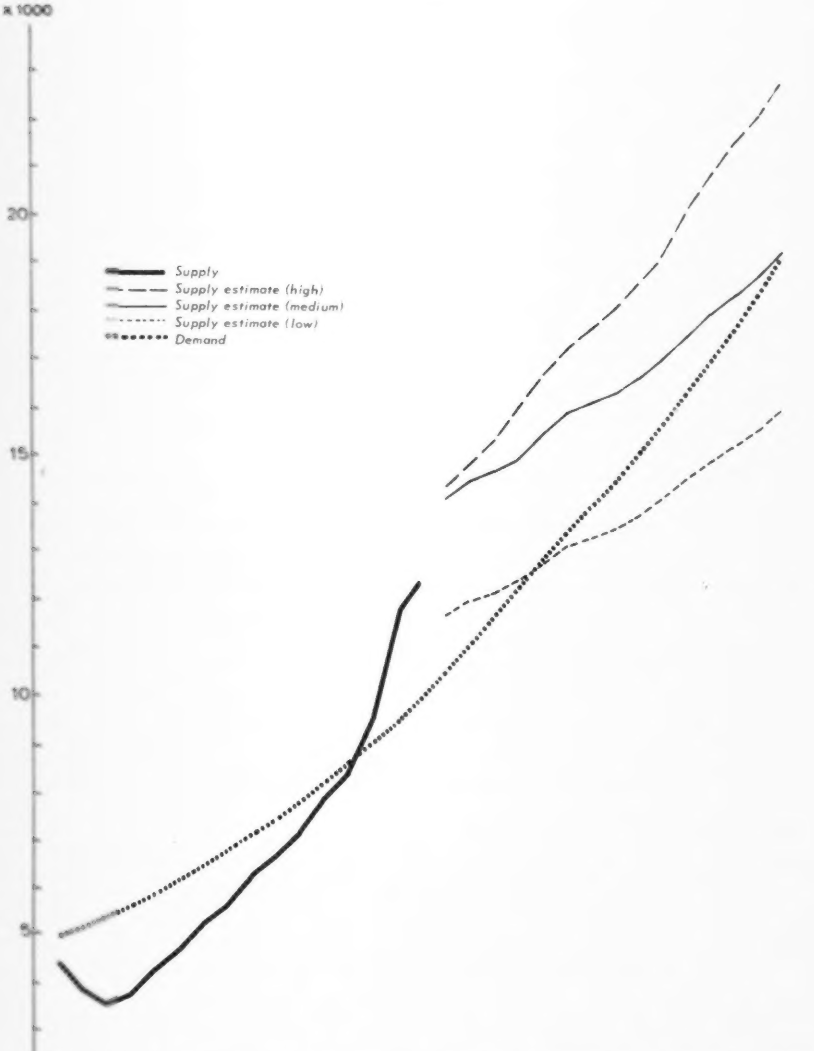
Thousands

	Supply				Demand		
	1965	1970	1975	1980	1970	1975	1980
Theology	4.0	3.9	4.3	4.8	4.4	4.6	4.8
Law	9.7	10.4	13.4	16.4	11.7	13.2	15.0
Social sciences	0.9	1.6	3.3	6.0	1.6	2.6	4.0
Languages	4.4	5.7	7.6	10.0	7.1	8.7	10.4
Economics	5.1	6.6	9.5	13.4	7.0	9.0	12.0
Psychology	1.0	1.6	2.8	4.9	1.5	2.2	3.0
Geography	0.8	1.2	1.5	2.1	1.1	1.3	1.6
Other subjects	0.9	0.9	1.2	1.5	1.2	1.5	2.0
	(26.8)	(31.9)	(43.6)	(59.1)	(35.6)	(43.1)	(52.8)
Mathematics and natural sciences	6.9	8.8	12.0	16.5	9.6	12.2	15.3
Technology	11.3	14.0	19.2	26.2	16.0	20.0	26.0
	(18.2)	(22.8)	(31.2)	(42.7)	(25.6)	(32.2)	(41.3)
Medicine	13.1	13.7	15.8	19.0	16.3	18.5	20.9
Dentistry	2.6	2.9	3.4	4.2	3.8	4.8	5.9
	(15.7)	(16.6)	(19.2)	(23.2)	(20.1)	(23.3)	(26.8)
Veterinary medicine	1.2	1.3	1.9	2.7	1.5	1.7	1.9
Agriculture	1.9	2.2	2.9	3.7	2.4	2.9	3.5
	(3.1)	(3.5)	(4.8)	(6.4)	(3.9)	(4.6)	(5.4)
Total	64	75	99	131	85	103	126

(1) "Numbers of University Graduates up to 1980, Demand and Supply", University Council, The Hague, 1968.

Graph 13

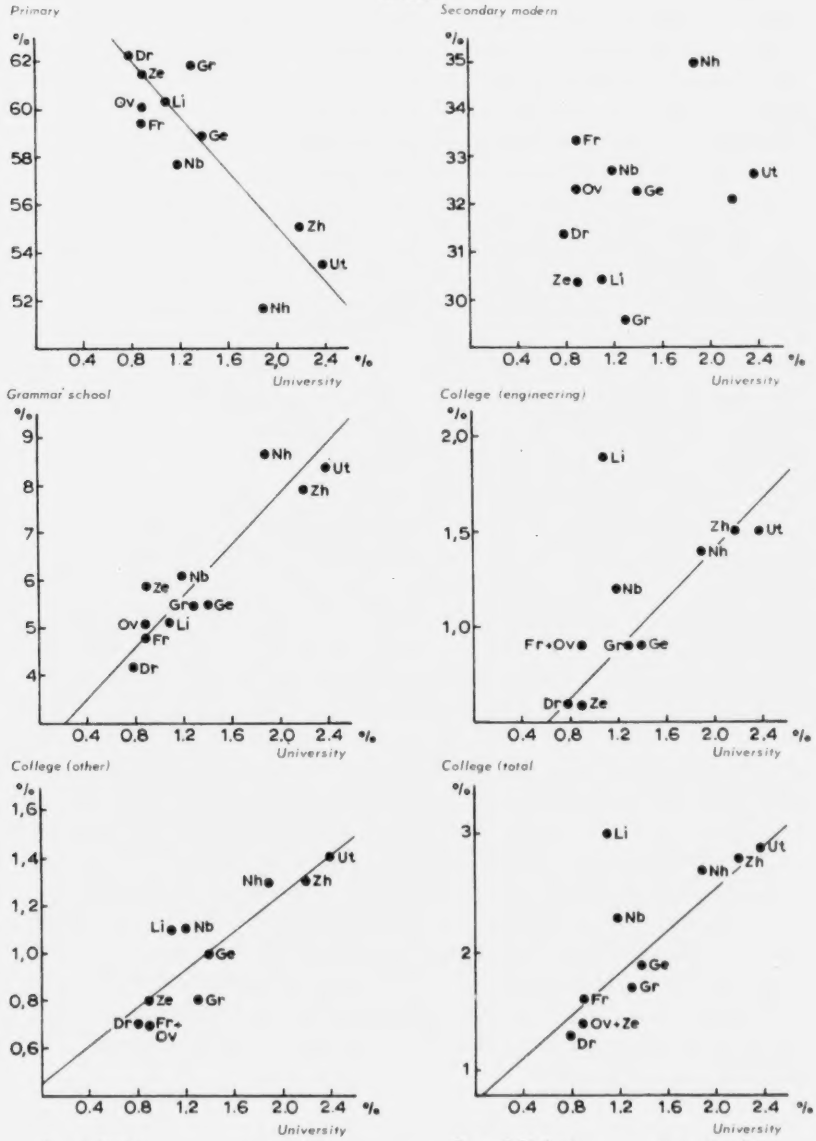
TOTAL NUMBER OF UNIVERSITY FRESHMEN, DEMAND AND SUPPLY, 1950-1980



Graph 14

NUMBER OF WORKERS WITH UNIVERSITY EDUCATION AND NUMBER OF WORKERS WITH OTHER EDUCATIONAL LEVELS AS A PERCENTAGE OF TOTAL LABOUR FORCE, PER PROVINCE, 1960

MALES



Dr = Drenthe
Gr = Groningen
Ze = Zeeland
Li = Linberg
Ov = Overijsel
Fr = Friesland
Ge = Gelderland
Noord Brabant
Zh Zuid Holland
Ut = Utrecht
Nh = Noord Holland

Between 1950 and 1965 supply of university graduates fell short of demand. On the basis of the figures in Table 22 one may conclude that in general the shortage will continue to exist until 1975. Subsequently supply of graduates will be somewhat larger than demand; this is a consequence of the explosive expansion in university education which started some years ago. Surpluses may be expected, particularly in law, social sciences, psychology and geography. A change in the distribution of freshmen from social sciences to medicine and dentistry, for example, would be advisable.

On the whole, the picture thus obtained is fairly reassuring. An attempt is made, in Graph 13, to trace the supply and demand trends for freshmen up to 1980. As will be seen, the demand for freshmen (as calculated on the basis of the demand for university graduates in the past and future) shows a continuous growth. Between 1950 and 1962 the number of freshmen fell short of demand, causing shortages of university graduates as mentioned above. After 1962, the number of freshmen was in excess of demand. This excess has first to make up for past shortages and as was said above, around 1975 a balance between demand for and supply of graduates will be reached. What will happen next will depend, among other things, on the supply forecast accepted as the most realistic. If we take the medium estimate, a surplus of freshmen will be created up till 1980 when freshmen supply will meet demand. This surplus is required however to make up for the shortages which can be expected, as demand and supply will continue to grow after 1980 as they did before. Only when actual development becomes as was foreseen in the high estimate can a continuous surplus of freshmen be expected. Although no definite forecasts exist of personnel with lower educational levels (except for a few cases) Graph 14 indicates the tendencies to be expected. It shows that increasing densities of university-trained personnel are correlated with increasing densities of personnel having a college or grammar-school level of education. But the increase in the number of the latter categories is not so great as in the number of those with university education. Increasing densities of university graduates have necessarily to go with decreasing densities of personnel with primary educational level.

If one now compares the expected demand of university graduates and its correlates, the slighter increase in the lowest levels of personnel as compared with the decrease in the lower level, with what can be expected on the basis of the educational expansion as presented in Table 14, the result is fairly reassuring. One should not forget that the educational explosion is correlated with an explosive development in the demand for more and better educated personnel.

VI. CURRICULA, METHODS AND EDUCATIONAL AIDS

It is unlikely that anybody can make a forecast of the curricula, methods of instruction and educational aids which will - or should - be used in the far future. It seems better to report on current general ideas concerning the principal aspects of these subjects and on some experience in these fields, than to speculate about these items.

Educational research is somewhat underdeveloped in the Netherlands. For all branches there is a great need for research and development of curricula, methods of instruction and educational aids.

Curricula have the same significance for classroom instruction as programmed instruction has for individual instruction. They should be based on the goals and targets and on the position of the specific branch of education in the total structure of the educational system. Unfortunately no systematic research is done in this field. Definite conclusions therefore cannot be given concerning curricula, but one may doubt whether they are geared to the future development of society in all its aspects.

Experience shows that the introduction of new curricula and methods meets with great resistance on the part of the teachers. Experimenting with new methods is therefore not sufficient. Equal importance should be attached to the introduction and follow-up of new methods and subsequently to an evaluation. Regular and compulsory retraining of teachers should accompany this, as satisfactory innovation in education is totally dependent on a close collaboration with the teachers. All these elements of innovation in education are not totally neglected in the Netherlands, but a sufficiently important systematic and strategic approach is lacking.

To achieve a qualitative improvement in education, teachers continuously request for every branch a further decrease in pupil/teacher ratios. As a consequence, education shows a tendency to become increasingly more labour intensive, and an increasing tendency towards decreasing labour productivity. Somewhere society has to stop this trend otherwise education will become too expensive. The qualitative improvement of education therefore becomes necessary not by means of a further decrease in the pupil/teacher ratio but by using methods which are more capital-intensive to increase the productivity of the teachers (considered as in industry).

The development in electronics has resulted in a vast improvement in communication techniques. In formal education, communication is the basis of the learning process, and various communication techniques can be applied in education. Investigations have shown the favourable effect of these techniques on educational achievement. The introduction of these techniques into the educational system has been slow up to now, but conditions for introduction are improving rapidly. Perhaps the most decisive factor in this is the change in climate. Young teachers are growing up with the use of teaching aids such, as television, computers, etc., and it is only natural that they should want to introduce them into their own school.

Some of these aids may also provide a solution to those educational problems which would be difficult to solve even if the pupil/teacher ratios were lowered. The desirable greater differentiation in education can be achieved only by abolishing class-room instruction. For many parts of the curriculum in many types of schools it is desirable to divide pupils into more homogeneous groups of the same intellectual level, or with the same interest. A more intensive use of film, radio, television, video-tape, tape recorder will make this division possible and at the same time relieve the teacher of part of his burden. It should not be thought, however, that the teacher becomes superfluous: supervision of pupils will always be necessary. When these techniques are used for training in highly specialized subjects and for demonstration purposes, the need for specialized knowledge on the part of the teacher diminishes. This makes it possible for the teacher to stress the pedagogical side of his task and thus enhance the quality of education.

Pupils whose ability does not allow them to follow the normal pace of instruction create a serious problem. In the present system they either have to repeat classes or they drop out. In these cases (50 per cent of the pupils in Dutch schools) individual coaching is made possible by the use of teaching machines, language laboratories, etc.

In the long run these aids, and other still to be invented, may revolutionize the whole system of education. It would already be a major improvement if they could be used in getting rid of existing bottle-necks in education. Great care is needed to choose the correct techniques which according to industrial experience, are the kind which do not impede further technological development.

The impact of these techniques on teacher requirements and on expenditure for education is not known, but the results of experiments are not encouraging. These experiments, however, are of a limited scale and only the short run effects can be measured as yet. In the long run, teaching aids may perhaps make the profession more attractive. This is very necessary, as the supply of teachers has always fallen short of demand in the postwar period. Perhaps these aids also make it possible to differentiate more within the teaching profession (as they do in industry). Perhaps these education aids will not bring about a slower increase in educational expenditure, but rather an educational system with higher internal efficiency by a better combination of labour and capital inputs.

VII. THE EDUCATIONAL STRUCTURE

Old structure

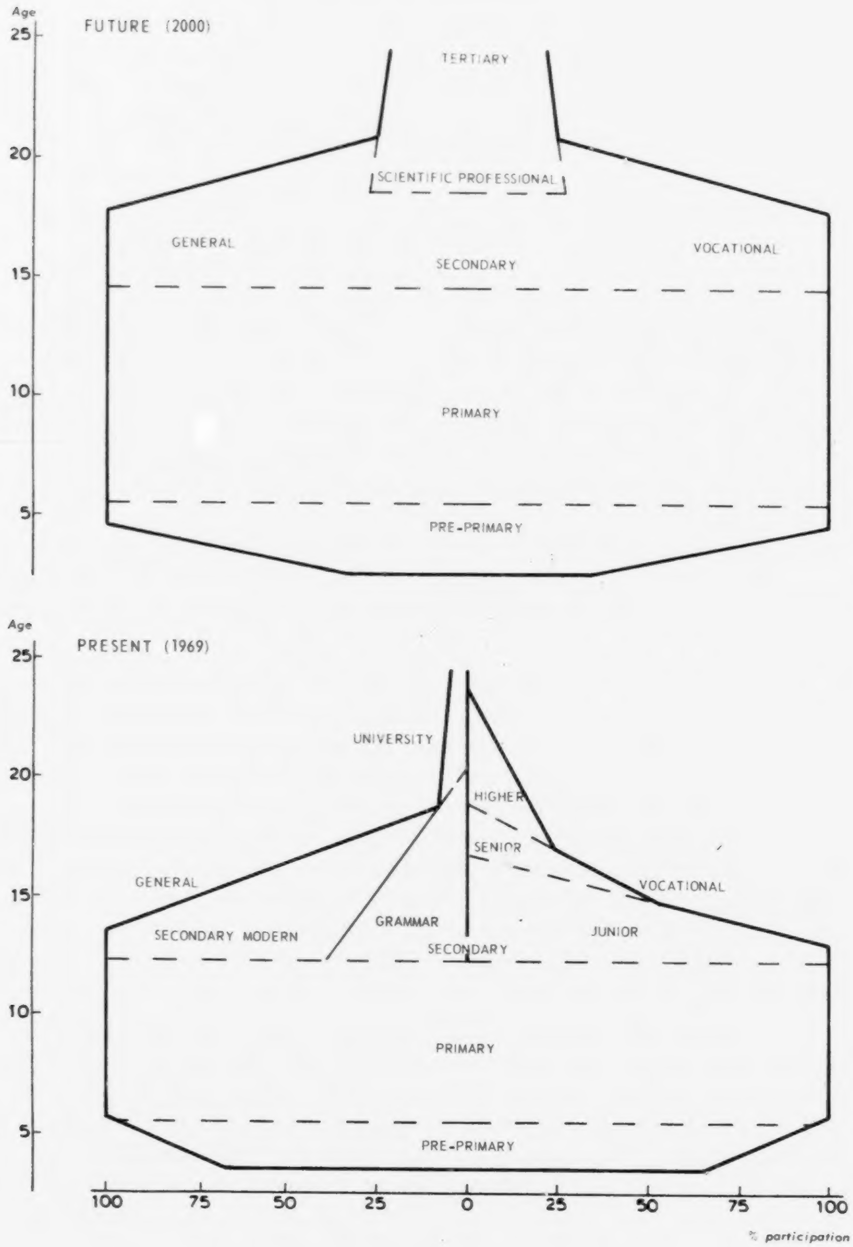
Until recently, the structure of the educational system was determined by the social class structure of the 19th and early 20th century. It was more or less accepted that the university and the preparation for it (gymnasium) were reserved for the élite. The grammar school, or as it is called in Holland, the hogere burger school (literally higher bourgeois school) was considered a suitable educational level for sons of members of the upper middle class. Primary education (and perhaps some additional night courses) would be sufficient to meet the needs of the lower classes. The rigid social class system was thus reflected in a rigid compartimentalisation of education, and it was as difficult to move from one social class to another as it was to change from one type of school to another.

Since the beginning of the century, the educational system has been adapted to the economic needs of society. Continuation classes were attached to the primary schools, and the secondary modern school (for lower middle classes) and technical and vocational schools (for the sons of labourers) were created. Since then, numerous types of schools have been created following the continuous differentiation and specialization in the occupational structure of the labour force. The basic structure of the educational system was retained, characterized by different fairly rigidly separated streams. This system is shown in Graph 15.

After pre-primary education (lasting 2 years, and available for children of 4,5 and sometimes 6 years old) follows primary education (6 years). At the age of 12 (13) pupils must choose between grammar (5 or 6 years), secondary modern (3 or 4 years) and junior technical education (2 or 3 years). Only grammar school education leads to university (± 7 years). Secondary

Graph 15

THE PRESENT AND FUTURESTRUCTURE OF EDUCATION IN THE NETHERLANDS


Age
25
20
15
10
5
FUTURE (2000)
TERTIARY
SCIENTIFIC PROFESSIONAL
GENERAL
SECONDARY
VOCATIONAL
PRIMARY
PRE-PRIMARY
Age
25
20
15
10
5
PRESENT (1969)
UNIVERSITY
HIGHER
SENIOR
GENERAL
VOCATIONAL
SECONDARY MODERN
GRAMMAR
JUNIOR
SECONDARY
PRIMARY
PRE-PRIMARY
100
75
50
25
0
25
50
75
100
% participation

modern education leads to vocational (mostly non-technical) education at senior college level. Junior vocational education leads to senior technical education which opens the door to technical education at college level. Pupils who have reached this stage in the technical stream are allowed to go to the university of technology. The consequence of this rigid system is clear: whoever enters one of the streams is almost doomed to stay there. Escape to other streams is not uncommon, but is difficult to accomplish.

Present reforms and recent proposals

Criticism of the old system dates far back. Until recently, however, proposals to reform the educational structure failed to receive the consent of the Ministry of Education, of Parliament, or of the public at large. This does not mean that no changes were made, but that they were directed mainly towards innovating the structures and curricula of the various types of education and left the structure of the educational system much as it was.

In 1968, after some experimentation, a start was made towards the implementing of the so-called "Mammoth Law" intended as a major reform (in Dutch eyes) of secondary education(1). Some of the important points are:

1. Introduction of a separate "bridge" (transitional) year for technical and vocational education and for non-vocational education.
2. Some reforms of existing types of schools. The (old) modern grammar school with its double function of supplying university education and vocational education at college level with freshmen is strengthened in its first function by i.e. lengthening the course by one year.
3. Creation of new types of schools. Especially important is the creation of the so-called HAVO type of education. Starting either directly after primary education (with a 5 year course), or after secondary modern (with a 2 year course) or after 2 years of grammar school

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(1) See the Annex in which a comparison is made between the old and the new educational system.

it will be the required standard for college level education. It is intended mainly for modern grammar school pupils who do not want to go on to the university. Other new types are commercial schools at junior, senior and college level.

4. Curriculum choice possibilities for pupils in the various types of secondary education. The transitional year and the curriculum choice possibilities are no doubt improvements, but the early and almost final choice still remains between vocational and non-vocational education (at 12), and between the various streams or types of education within the vocational and also within the non-vocational stream (at 13), and the difficulties of passing from one type of education to another. Technical and vocational education remain in their old unfavourable position.

It is therefore understandable that many educationalists are not very happy about the present reform. Some critics consider that the Mammoth Law is either 30 years too late or 10 years too early, meaning that either it should have been passed 30 years ago, or that, in another 10 years a much more adequate and up-to-date reform would have been possible, based on new conceptions of educational structures. Although, the Mammoth Law in itself is not revolutionary, insomuch as it is an attack on the old system it has stirred people to a critical rethinking of the total structure of the educational system, the goals which education has to serve, new didactic methods of teaching, etc.

Some of the more recent proposals about the structure of education and of the interrelations between the various types of education are discussed below.

Pre-primary and primary education

Pre-primary education, intended to supplement family-upbringing and as a preparation for primary education, had to refuse admission to children of 3 due to shortage of teachers and buildings. Almost everyone agrees this restriction should be lifted as soon as possible.

Compulsory education starts at the age of six in primary school. The narrow limits set to the age at which compulsory education starts and the complete separation of primary and pre-primary education produces a wide range in school maturity of pupils in the first grade of primary education. This classroom instruction results in 10 per cent repeaters in the first grade. This situation could be improved by a smooth transition from pre-primary to primary education, the transitional period covering the last grade of pre-primary education and the first grade of primary. Strong arguments have been put forward to lower the compulsory starting age to 5 in this connection. Admission to the more formal type of primary education might then be conditional on the school maturity of each pupil, thereby solving the problem of repetition in the first grade.

In the higher grades of primary education repetition rates are 4 to 5 per cent, so that 30 per cent of pupils have repeated one or more grades by the end of primary education. The main cause is the difficulty pupils encounter in adapting themselves to the primary school curriculum. This curriculum is largely the result of the traditional opinion that primary education is an end station in the educational process. Experiments are being undertaken to adapt the curriculum better to individual capacity. This, and changing ideas about the desirability of repetition, has led in some regions to the abolishing of repitition in the first grade of primary education.

Secondary education

One of the main criticisms of the new system is that it perpetuates the social class separation between vocational and non-vocational education. This can be overcome only by postponing the age at which a choice between the various types of education has to be made. Proposals include an additional year to the existing transitional year, and some experiments have been made in which school communities cover both vocational and non-vocational schools.

Education at the third level

The growing importance of university education for the development of society in its many aspects and the rapidly increasing number of university students have led to the conclusion that a major reform of university education is inevitable.

Many reports have been published on the subject in rapid succession, of which the most important was the official one "Posthumus" (intended as a basis for discussion). It pays special attention to the dual function of university education: the independent pursuit of knowledge and the preparation of people for occupations or positions in society. The present policy of fulfilling both functions at the same time has led to a continuous overloading of curricula, a levelling up of examination standards, a lengthening of the duration of studies and low pass rates.

For most branches of study the official length of the course is 5 years, but the student requires about 7 years to complete it and even 9 for medicine. The pass rate is low: more than 30 per cent of freshmen give up after 1 or 2 years, which means waste of talent, money and time.

For most of the students, university education means preparation for functions in society which do not need a profound scientific knowledge. Most proposals therefore consider it desirable to cut the total course into two parts. In the first part emphasis would be put on professional training, and in the second (for the intellectual élite) on the scientific training or the independent pursuit of knowledge.

This structure would allow university education and higher professional training, which are rigidly separated under the Dutch educational system, to be integrated. An important argument in favour of this structure is that the greater flexibility of transition possibilities between the types of education at third level would ensure better use of scarce talents and would be a step forward towards the democratization of higher education.

Sufficient differentiation should be created within the third level. After a common propaedeutical year students should be selected for either the more practical (professional) stream or the university stream. For the third level, as a whole, a first stage of 4 years is envisaged, on completion of which each student receives a masters' degree, thereby abolishing the existing discrimination between university degrees and higher professional degrees.

The second stage (2 or 3 years) provides further scientific training leading to Ph.D. for those who followed the university stream. This phase can also be used for extended professional training for medical doctors etc.

Students will be allowed to exceed the official length of the course by one year for each stage. The actual period of study for most students would thereby be reduced to 4 or 5 years and for a small group of selected students to 7 or 9 years.

Some suggestions about the future structure

Although present reforms and recent proposals all point in the right direction, they are not sufficient. The great problem is still the early streaming (at the age of 12 or 13), of pupils over the various types of education, a procedure which was possibly justified at a time when only a small percentage of youngsters went on to long secondary education.

In view of the possibility of an extension to compulsory education to include the 19 year olds, a further restructuring of education will be necessary. A decisive step forward would be the creation of nine years common basic education for everyone, streaming to begin only at the end of this period.

VIII. PLANNING OF EDUCATION

The planning of planning is very important, so that consideration should be given to the extent to which the existing mechanism is able to deal with the problems of the future development of education.

An examination of the existing practice and state of affairs in the Netherlands shows that all the necessary elements for integral and comprehensive planning are available(1). All the planning activities are too widely dispersed, however, over the various types of schools, the numerous institutions and committees, and over quantitative and qualitative problems.

The planning mechanism is different for:

- pre-primary and primary education;
- secondary education;
- university education.

Not only are there no links between the planning of these types of education but, within each type, there is virtually no co-operation between those who are engaged in the quantitative aspects of planning (supply of pupils, demand for and supply of teachers, demand for skilled workers of various educational levels, expenditures on education, required construction, etc.) and those who are involved in the qualitative aspects of educational planning (curriculum planning, social questions, pedagogical and didactical problems). Within these two broad fields, collaboration between the various specialists, agents and institutions is virtually non-existent.

The consequence of this piecemeal and scattered approach is that there is no plan of education (short, medium or long term) covering simultaneously all the types of education and all the various quantitative and qualitative aspects. Instead, there are a confusing number of plans, proposals and ideas. This is perhaps why - notwithstanding the praise due to the Ministry of Education for the enormous amount of activity undertaken in the post-war period (when the Netherlands comes second on the list of countries ranked according to percentage of GNP on education) - nobody is satisfied with educational policy in the Netherlands.

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(1) See, e.g., Educational Policy and Planning in the Netherlands, OECD, Paris, 1967

We find when considering the measures which should be taken to remedy the situation that unfortunately no definite norms exist as a basis for the creation of an adequate planning organisation. Experience in economic and physical planning in the Netherlands shows that institutionalization is a prerequisite for adequate planning - the implication being that it is necessary to create an Educational Planning Bureau comparable to the Central Planning Bureau (for economics) or to the Physical Planning Bureau. A comparison of the planning mechanisms in the various fields of government activity shows that the one for economic affairs is the most advanced. The three most important organisations in this field are the Central Planning Bureau, the Social-Economic Advisory Council and the Council of Economic Affairs (at ministerial level). In this structure expertise (Central Planning Bureau) the public at large (Social-Economic Advisory Council, composed of representatives of trade-unions, employers' unions and independent members) and top policy-makers (Council of Economic Affairs composed of all the ministers - great importance being attached to those for Finance and Economic Affairs) have their proper place. Good co-ordination is ensured by the Central Planning Bureau which services the Social-Economic Advisory Council and the Council of Economic Affairs.

If, however, planning mechanisms were to be created similar to that for economics for all fields of government activities, the country would be flooded by them. An alternative solution would be to create a department of planning within the Ministry of Education or within the Central Planning Bureau ten times as big as the division which now exists.

In all these three possible structures, educational planning is separated from the broader field of social planning. Since the educational process is only part of the broader social process, the question arises as to the advisability of creating a Social Planning Bureau covering such aspects of social life as education, social care, employment, leisure, cultural affairs, medical care, etc. The new statistical approach, aiming at a system of integrated social statistics would provide a solid statistical basis for planning which would cover simultaneously the various aspects of social life. In this structure the Social Planning Bureau could provide the various government departments with general guidelines, broad targets and rough plans, these could be detailed and tailored by smaller planning units in the departments concerned to fit the wishes of the policy-makers.

* * *

Whatever structure is chosen it will have to contend with a difficulty similar to that found in other fields of government activities. Planning in the various fields is not co-ordinated and forecasts are established in a way similar to that used for those presented in Chapter IV - though not as systematically and regularly revised. These are necessary exercises but no one can tell whether the plans or forecasts are feasible or not. When looked at separately it is impossible to say whether they are feasible. The forecasts of expenditures on education for example, as presented in Table 21, are not unrealistic. But if all the plans and proposals in the various fields of government activity are added together, implementation is shown to be impossible, as the total surpasses financial and manpower resources. This, in principle, means that partial planning is impossible. Experience shows the need for an organisation capable of constructing a rough master plan for the development of government activities, and which should be based on continuous communication between the central organisation and the specialized planning agencies. Without such an organisation, adequate planning of education will be impossible.

ANNEX

GLOSSARY OF THE MAJOR TYP

PRESENT SYSTEM

Types (in Dutch)	Types (in English)	Description	Year
Pre-Primary Level			
kleuteronderwijs (k.o.)	nursery school	education preceding primary school	2
First Level			
gewoon lager onderwijs (g.l.o.)	primary school	first part of compulsory education; a common foundation for all post-primary education	6
buitengewoon lager onderwijs (b.l.o.)	special school	special education for children who cannot be educated satisfactorily in an ordinary primary school (including children of barge crew members)	6-8
Second level (linking up with the first)			
voortgezet gewoon lager onderwijs (v.g.l.o.)	continuation school	lower general post-primary education, preparing for life in adult world, or smooth transition to vocational training proper	2
uitgebreid lager onderwijs (u.l.o.)	secondary modern school	middle post-primary education (non-pre-academic)	3-4
handelsschool (h.d.s.)	commercial college	general post-primary education with a stress on training for higher functions in the crafts, the retail trade and the service industry.	4-5
	does not exist		
hogere burgerschool (h.b.s.)	modern grammar school	higher general post-primary education: partly pre-academic education, after 3 years divided into: (a) h.b.s. -A, with emphasis on social sciences and languages (b) h.b.s. -B, with special attention given to the natural sciences	5
gymnasium	grammar school	pre-academic education; in the last two years divided into: (a) gym.alpha stream, with emphasis on Greek and Latin; (b) gym.beta stream, with Greek and Latin, but with stress on the natural sciences	6
lyceum	combined grammar school	a combination of a gymnasium and a h.b.s., associated in certain cases, with a girls' modern grammar school	5-6
middelbare school voor meisjes (m.s.v.m.)	girls' modern grammar school	higher general post-primary education preparing girls for the adult world or for higher vocational education	5

OF SCHOOLS IN THE NETHERLANDS

FUTURE SYSTEM			
Types (in Dutch)	Types (in English)	Description	Years
no change			
no change			
no change			
lager algemeen voortgezet onderwijs (l.a.v.o.)	lower general secondary school	lower general post-primary education can be given in lower vocational schools (usually one-year course) or in separate schools in a two-year course	1-2
middelbaar algemeen voortgezet onderwijs (m.a.v.o.)	middle general secondary school	middle general post-primary education will be given in separate schools	3-4
does not exist			
hoger algemeen voortgezet onderwijs (h.a.v.o.)	higher general secondary school	higher general post-primary education will be given in: (a) separate schools (b) atheanea; lycea and middle general secondary schools (2-year course) (c) teacher training colleges (the first two years)	5 (2-)5
atheneum	modern grammar school	pre-academic education; in the final years divided into: (a) atheneum-A with emphasis on social sciences and languages (b) atheneum-B with special attention given to natural sciences	6
gymnasium	grammar school	pre-academic education; in the final years divided into: (a) gym-alpha stream, with emphasis on Greek and Latin (b) gym.beta stream, with Latin and possibly Greek, with stress on the natural sciences.	6
lyceum	combined grammar school	pre-academic education; a combination of gymnasium and atheneum	6
does not exist			

GLOSSARY OF THE MAJOR TYPES

PRESENT SYSTEM

Types (in Dutch)	Types (in English)	Description	Years
lagere technische school (l.t.s.)	junior technical school	training for lower technical functions in; industry, commerce, fishery and transport	3
lager nijverheidsonderwijs voor meisjes	junior domestic science school	training for girls in home economics and other feminine occupations	2
lagere landbouwschool/lagere tuin bouwschool	junior agricultural/horticultural school	training for lower functions in agriculture/horticulture	4
school voor detailhandel	retail trade school	training for lower functions in the crafts, the retail trade and the service industry	2-3
		does not exist	
Third Level (linking up with the second)			
uitgebreid techn. school (u.t.s.)	senior technical school	training for middle technical functions in: industry, commerce, fisheries and transport	3
uitgebreid lager nijverheidsonderwijs voor meisjes (u.l.n.o.)	senior domestic science school	more advanced training for girls in home economics and other feminine occupations	3
middelbare landbouwschool/middel bare tuinbouwschool	senior agricultural/horticultural school	training for middle functions in agriculture/horticulture	1½
		does not exist	
		does not exist	
		does not exist	
kleuterleidster opleiding (k.l.o.s)	nursery teachers' training college	training for nursery school teachers	3-4
kweekschool voor onderwijzers/essen	teachers' training college	training for primary school teachers (first and second phase) and for teacher leadership roles (third phase)	4-5

OF SCHOOLS IN THE NETHERLANDS (continued)

FUTURE SYSTEM			
Types (in Dutch)	(Types (in English)	Description	Years
no change(1)			
no change(1)			
no change			
lager middenstandsonderwijs	commercial school	training for lower functions in: the crafts, the retail trade and the services.	3-4
lager economisch en administratief onderwijs (l.e.a.o.)	junior economic and administrative school	training for lower economic and administrative functions in: commerce, industry, transport, government, insurance, banking, etc.	3-4
middelbaar technische school (m.t.s.)	middle technical school	training for middle technical functions in: industry, commerce, fisheries and transport	3-4
middelbaar huishoud- en nijverheidsonderwijs voor meisjes	middle domestic science school	more advanced training for girls in home economics and other feminine occupations	3-4
no change			
middelbaar middenstands onderwijs	middle commercial school	training for middle functions in: the crafts, the retail trade and the services	3-4
middelbaar economisch en administratief onderwijs (m.e.a.o.)	middle economic and administrative school	training for middle economic and administrative functions in:.commerce, industry, transport, government, insurance, banking, etc.	2-4
middelbaar sociaal-pedagogisch onderwijs	middle social-pedagogical school	training for middle functions in the field of youth work, adult education, social work, and public health	3-4
no change			
no change			

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(1) Duration of the course will be lengthened by transitional year.

GLOSSARY OF THE MAJOR TYPES

PRESENT SYSTEM			
Types (in Dutch)	Types (in English)	Description	Years
hogere technische school (h.t.s.)	technical college	training for higher technical functions in: industry, commerce, fisheries, and transport	4
middelbaar nijverheidsonderwijs voor meisjes	domestic science teachers' training college	training of teachers of domestic science schools for girls	4
hogere landbouwschool/hogere tuinbouwschool	agricultural/horticultural college	training for higher functions in agriculture/horticulture	3
does not exist			
does not exist			
sociale academie	social workers training college	training of youth leaders and preparation for careers in similar social-pedagogical fields	4
leraren opleiding voor het nijverheidsonderwijs (N.O.-akte)	teachers' training for technical schools for boys	training of teachers in junior and senior technical schools: at institutes of the Netherlands Society for the Training of Teachers for technical Education (mainly evening schools)	6
leraren opleiding voor het middelbaar onderwijs (M.O.-akte)	teachers' training for secondary schools	teachers' training at institutes preparing for the secondary school teachers' certificates	5-7
zeevaartschool	nautical college	training of navigation officers, engineers and radio operators for the merchant navy	2-4
kunstnijverheidsschool	art college	training in applied art with sections for drawing, painting, sculpture, industrial design, etc.	5-7
universiteit, hogeschool	university		

SCHOOLS IN THE NETHERLANDS (continued)

FUTURE SYSTEM			
Types (in Dutch)	Types (in English)	Description	Years
no change			
hoger huishoud- en nijverheidsonderwijs voor meisjes	domestic science teacher training college	training of teachers of domestic science schools for girls	4
no change			
hoger middenstandsonderwijs	commercial college	training for higher functions in the crafts, the retail trade and the service industry	4-5
hoger economisch en administratief onderwijs (h.e.a.o.)	economic and administrative college	training for higher economic and administrative functions in: commerce, industry, transport, government, insurance, banking, etc.	2
no change			
no change			
no change			
no change			
no change			
no change			

V

LONG RANGE PLANNING FOR AMERICAN EDUCATION

by

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I. INTRODUCTION

This paper has been submitted by Dr. Joseph Froomkin, Assistant Commissioner of Education for Planning and Evaluation, United States Office of Education. It gives a succinct review of recent efforts in the United States in long-range analyses of the future of education. The treatment here of various contributions in this field is necessarily often very brief and does not pretend to cover the full content of various contributions. However, the paper does put this review of American activity in this field within the context of governmental policies and efforts to carry out long-range projections and long-range planning at both federal and state or regional levels.

This paper characterizes current efforts to project the future of education under five headings:

- Genius Forecasting
- Trend Extrapolation
- Scenario Construction
- Simulation
- Consensus Planning.

Relevant literature in the United States is referred to in the paper, although, of course, no attempt is made to cover all the recent United States publications which may be important in this field, /for example, Inventing Education for the Future (W. Hirsch, ed.), and Dialogue on Education (R. Kean, ed.), Education and Ecstasy, G.B. Leonard, etc./.

There is a brief report of the unique arrangement whereby the Federal Government has launched a long-range planning activity by giving contracts to two educational policy research centres. These two centres (Stanford Research Institute and Syracuse University) have been funded for the specific purpose of providing the educational community, particularly the federal education agencies, with policy alternatives whose long-range effects have been analysed.

A fairly detailed account is given of the eight-state long-range regional planning exercise conducted during the past three years (an example of "consensus planning").

Finally, the paper alludes to the growing political support for further long-range planning for education and specifically calls attention to a recent speech in which President Nixon called for "the establishment of a long-range planning capability in education which would determine the needs and resources and state clearly the alternatives which can be pursued by educators".

II. LONG-RANGE PLANNING

Currently there is very little formal long-range planning for American education at the Federal level. An exploratory attempt of the Office of Program Planning and Evaluation to quantify developments in education to the mid-70s was published in 1968(1). This paper did not go beyond the bare outline of projecting enrolments, teacher supply and financial implications of limited departures from the conventional mix of elementary, secondary and higher education.

For the longer range even more elementary projections of educational attainment and school attendance have been prepared by the United States Bureau of the Census(2). These are based on the agency's population estimates, themselves based on an extension of past trends of the proportions of the population in each age group likely to participate in the educational process.

In addition, the United States Office of Education, National Center for Educational Statistics, annually produces ten-year projections of enrolments by level, demand for educational personnel and numerous other relevant series of educational statistics(3). Enrolment is projected consistently with population projections of the Bureau of the Census. Trends in participation in education, teacher/student ratios and other relationships are generally projected on the basis of past trends of relevant variables, based on least-squares fits of data for previous years.

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(1) United States Department of Health, Education and Welfare, Office of Education, Office of Program Planning and Evaluation, Education in the Seventies, United States Government Printing Office, Washington, D.C., 1968.

(2) United States Department of Commerce, Bureau of the Census, Projections of Educational Attainment, 1970-85, Series P-25, No. 390.

(3) United States Department of Health, Education and Welfare, Office of Education, National Center for Educational Statistics, Projections of Educational Statistics to 1976-77, United States Government Printing Office, Washington, D.C., 1968, (the latest published volume).

A clear distinction must be made between projections of past trends and long-range planning. While the projections will probably reflect what is likely to happen, if other things remain equal, long-range plans must specify goals and outline the principal activities to be mounted if these goals are to be met.

The more detailed and comprehensive projections of educational objectives are generally sponsored by private organisations, universities or *ad hoc* commissions. These projections can generally be characterised under the following five headings:

1. *Genius Forecasting*. This sort of planning is based on the intuitive judgement of a single individual. Occasionally, in education, the statement of a respected leader gets considerable acceptance and reality tends to follow the forecast.

2. *Trend Extrapolation*. In these circumstances, past trends are extrapolated into the future up to some natural limit. For instance, attendance in higher education institutions may be limited by the number of high school graduates it is possible to enrol in those institutions.

3. *Scenario Construction*. This method, made popular by the Rand Corporation and the Hudson Institute under Herman Kahn, is based on answering a series of questions based on a menu of assumptions. For instance, what will the impact on education be if the affluence of the population in a given country doubles in the next 30 years, and the society becomes more permissive? What if it becomes more authoritarian?

4. *Simulation*. In simulation models, planning is based on a mathematical model of the society and its dynamic environment. By varying some of the inputs or operational factors of the model, the simulation produces a forecast in the same way that an equation depicting a natural law forecasts the anticipated results of physical phenomena. Very few attempts at long-run simulation are being constructed right now because of the uncertainty of estimating major parameters many years ahead.

5. Consensus Planning. This approach is based on getting the agreement of a group of persons regarding the desirable outcomes of the educational process. Generally a large number of experts are assembled and their views are solicited about the changes which must be made by the educational system if commonly agreed goals are to be met.

Because of the considerable pressures on the educational system in the past two decades, the authorities with the greatest status in the educational community, such as Conant and Tyler, have generally restricted their comments to a criticism of the present or suggestions for the immediate future. We know of no overall blueprint for education prepared by any single person 35 years in advance.

Trend extrapolation of requirements and arrangements in the educational system have been done repeatedly, mostly by economists interested in the future developments of the educational sector. One such interesting exercise pricing out the cost of generally agreed standards in education was prepared as part of the Dollar Cost of Our National Goals, a volume edited by Leonard A. Lecht for the National Planning Association(1).

An intriguing cross-sectional analysis of educational requirements in countries at different levels of economic development was prepared by Frederick Harbison and Charles A. Myers(2). These two authors attempted to describe strategies of human resources development and discuss the implications of certain choices in underdeveloped countries, partially developed countries, semi-advanced countries, and advanced countries.

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(1) Leonard A. Lecht, The Dollar Cost of Our National Goals, National Planning Association, Washington, D.C., May 1965.

(2) Frederick Harbison and Charles A. Myers, Education, Manpower and Economic Growth, McGraw-Hill Book Company, New York, New York, 1967.

The most famous example of scenario construction, or at least the best selling one, is the one by Herman Kahn and Anthony J. Wiener(1). The fundamental reasons for indulging in this type of prognosis are stated by the authors as follows(2):

1. To stimulate and stretch the imagination and improve the perspective.
2. To clarify, define, name, expound, and argue major issues.
3. To design and study alternative policy "packages" and contexts.
4. To create propaedeutic and heuristic expositions, methodologies, paradigms, and frameworks(3).
5. To improve intellectual communication and co-operation, particularly by the use of historical analogies, scenarios, metaphors, analytic models, precise concepts and suitable language.
6. To increase the ability to identify new patterns and crises and to understand their character and significance.
7. To furnish specific knowledge and to generate and document conclusions, recommendations and suggestions.

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(1) Herman Kahn and Anthony J. Wiener, The Year 2000, A Framework for Speculation on the Next Thirty-Three Years, The Macmillan Company, New York, 1967.

(2) *Ibid.*, pp.398-399.

(3) We use these rather pedantic words reluctantly, but they seem to be the best available to describe our objectives. By propaedeutic we mean pertaining to introductory instruction, although there is no suggestion of the oversimplified. Because creative integration of ideas must ultimately take place in a single mind, even a long sophisticated and knowledgeable policy-maker, analyst, long-range planner (or member of an interdisciplinary study group) must absorb many ideas from unfamiliar fields. Hence, propaedeutic techniques are indispensable. By "heuristic" we refer to that which serves to discover, or to stimulate investigation, or to methods of demonstration that lead an investigator to probe further. While heuristic techniques are not necessarily scholarly or rigorous, their value need not be belittled. Paradigm, a structured set of propositions, is discussed more fully below.

8. To clarify currently realistic policy choices, with emphasis on those that retain efficiency and flexibility over a broad range of contingencies.
9. To improve the "administrative" ability of decision-makers and their staffs to react appropriately to the new and unfamiliar.

Specific applications of this nature to the subject of education were outlined by these two authors in a document submitted to the United States Office of Education in 1968(1). This document ranged over a large number of topics including such expected staples as new skills needed in the post-industrial society and the most esoteric suggestions of the possibilities of improving human memory through protein manipulations.

A similar project about the nature of the economy in the year 2000 was sponsored by the American Academy of Arts and Sciences and a progress report contained in the *Daedalus* (Summer 1967). Two papers specifically dealt with the organisation of educational institutions: one by Stephen R. Graubard, "University Cities in the Year 2000" and the other by Harold Orlans, "Educational and Scientific Institutions"(2). Other issues of relevance to education, at least in the United States, were dealt with in other chapters dealing with technological change, communication, meritocracy, State-local relations, etc.

An interesting departure in long-range planning was started by the United States Office of Education in March 1968 when two educational policy research centres were selected for continued funding. The two centres, located at Standford Research Institute and Syracuse University, were selected from five pilot centres which had been studying the role of education in future society for the preceding nine months.

These centres, oriented towards future research rather than long-range planning, will be examining questions such as:

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(1) *Policy Research Center Program Final Report to the United States Office of Education-Bureau of Research*, Hudson Institute, Croton-on-Hudson, New York, 28th June, 1968.

(2) Stephen R. Graubard, "University Cities in the Year 2000" *Daedalus*, *Journal of the American Academy of Arts and Sciences*, Volume 96, No. 3, Summer 1967, pp. 817-822; and Harold Orlans, "Educational and Scientific Institutions", *Ibid*., pp. 823-831.

- How can education be employed to prepare citizens for the evolving future?
- How can education be employed to shape the kind of future that is desired?

While answering the first question will involve projecting present trends and teasing out the educational implications, in the second instance education will be taken as a crucial input in shaping the future itself.

The Stanford Center is looking at the ways education can help to change society with the minimum of disruption. It is looking at the role of education in reshaping society from, say, a system of coercive power to that of a shared power or anomie and alienation to responsibility.

A combination of the economic projections approach and the futuristic framework pioneered by Rand and Herman Kahn appears to have been adopted by the Educational Policy Research Center of Syracuse University. While researchers are attempting to forecast the level and composition of the gross national product in the distant future, others are preparing issue papers which will be useful in discussing alternative futures. For instance, John A. Henning and A. Dale Taussig, in The United States Economy Through the Year 2000 plan to look at alternative futures for the United States economy, under alternative assumptions(1). Another paper, by Thomas F. Green, Schools and Communities: A Look Forward, also discusses the new arrangements which may come about as a result of shifting social trends in the next 35 years(2). The author raises some serious questions about the utilitarian concept of schooling, and ends his paper with a question, "Dare the new social order build a new system of schools"? He implies that the future post-industrial society may be less utilitarian, more aesthetically oriented, and may require a new orientation for education. This and other "futures" will be examined by the Syracuse Center.

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(1) A. Dale Taussig and John A. Henning, The United States Economy Through the Year 2000, an unpublished manuscript prepared for the Educational Policy Research Center, Syracuse University, Syracuse, New York, June 1968.

(2) Thomas L. Green, Schools and Communities: A Look Forward, an unpublished manuscript. Professor Green is with the College of Education, Syracuse University, Syracuse, New York.

The function of these centres is to assist the educational community in analysing policy alternatives whose long-range effects are of critical importance.

The tasks of the centers are:

- To serve as a clearinghouse for relevant information and as an originator of policy thinking across the entire spectrum of education.
- To explore the future problems of society and investigate ways of meeting those problems.
- To assemble existing information research findings, expert opinions, results of experiments - and integrate them into alternative courses of action.
- To seek to uncover crucial gaps in data and suggest ways in which the missing data may be obtained.
- To serve as a communicator to the whole array of educational policy-makers, from the student and individual teacher to State administrators to Federal officials.

Just as we have been unable to find an example of genius forecasting, so have we failed to find an analytical model which mathematically simulated the future of education.

We must then turn to the consensus type of planning for education. The most comprehensive exercise in this connection was conducted in connection with designing education for the future by an eight-State project. Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming joined together to form a policy board and contribute a project staff to organise a series of conferences which have resulted in seven volumes dealing with implications for education of prospective changes in society. These volumes are collections of articles presented at these conferences held during the past three years.

The first volume, Prospective Changes in Society by 1980, Including Some Implications for Education(1), includes papers, some quantitative and some impressionistic, on such diverse topics as national educational trends, population trends, developments in the medical sciences, communication, transportation, and some arcane discussions about the future of humanity and human responsibility in the emerging society. Underlying much of the discussion was the concern about changing patterns of educational organisation, control and financing.

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(1) Prospective Changes in Society by 1980, Including Some Implications for Education, Reports prepared for the First Area Conference, Designing Education for the Future: An Eight-State Project, Denver, Colorado, July 1966.

The committee went on to consider at the second meeting(1) some of the fundamental issues likely to affect the role of the educational establishment in the next 20 years. Roughly one-fifth of the volume consisted of listing the goals for education. Each separate author, prominent in his own right, presented his views on the purposes and challenges of the educational process. In most instances, the goal statements were extremely broad and not subject to quantification. The major part of the volume was devoted to the scope of curricula spanning the period from early childhood to maturity and continuing education. The last one-third of the volume dealt mostly with organisational problems at different levels of the educational system, and the problem of financial arrangements. A number of important questions were raised, few were answered.

For the third meeting the theme of the conference is described by the title of the report, Planning and Effecting Needed Changes in Education(2). During this conference, the process of bringing about change in education was discussed. The volume starts out with a general overview which stresses the increasing gap between resources and aspirations of society for education. It introduced the idea of designing an educational system which would meet the aspirations of United States society, and still be within the range of resources which could be mobilized by State and local governments. The possibility of shoring up the resources of localities and States through Federal tax-sharing was also explored.

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(1) Implications for Education of Prospective Changes in Society, Reports prepared for the Second Area Conference, Designing Education for the Future: An Eight-State Project, Denver, Colorado, January 1967.

(2) Planning and Effecting Needed Changes in Education, Reports prepared for the Third Area Conference, Designing Education for the Future: An Eight-State Project, Denver, Colorado, June 1967.

Elsewhere in the volume, various planning methods and alternative strategies to effectuate change were presented. In order to clarify the alternatives for the future, it was suggested that greater stress be placed on educational research and development in learning theory. The theoretical insights, especially in the learning area, should then be translated into new instructional materials and methods, to be finally demonstrated in school settings.

The interaction of educational policies and the power structure in the United States was also analysed. In that connection, the uses of persuasion, community involvement and political power as levers for change were discussed.

As a result of these three conferences the commission engaged a consultant, Clifford F.S. Bebell, to prepare a short pamphlet to summarize the actions which should be taken(1). This publication again catalogued a large number of broad statements of purpose, broken down under a number of headings such as curriculum, instruction, practices, supporting services, evaluation, teacher education, and continuing education. These recommendations accurately reflect the present pluralistic value system of the educational community. The author concluded his discussion with a question, "Where does one go from here"? and suggested that everyone start where he feels a need. "The final challenge then is to provide help, encouragement and freedom for all to do the best they can"(2).

Reports prepared for another area conference included the pamphlet cited above and additional papers which appeared under the title of *Emerging Designs for Education*(3). In addition to Pr. Bebell's statement a further elaboration on the same subject by J. Cecil Parker and Raymond A. McGuire addressed itself to issues which required continuous consideration. It is interesting that Parker's and McGuire's conclusion again calls upon educators to require "the domination of planning operations by emphasis upon learning to learn - to unlearn - to relearn through school and throughout life"(1).

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(1) Clifford F.S. Bebell, *Designing Education for the Future: The Educational Program*, A report prepared for State Advisory and Study Committees, Designing Education for the Future: An Eight-State Project, Denver, Colorado: July 1967.

(2) *Ibid*., pp. 50-51.

(3) *Emerging Designs for Education: Program, Organization, Operation and Finance*, Reports prepared for an Area Conference, Designing Education for the Future: An Eight-State Project, Denver, Colorado, May 1968.

The other papers in that volume are more specific and discuss the organisation of school systems, State organisations and the economics of financing education in the American context, through a combination of local, State and Federal cost-sharing for educational purposes.

The fifth volume, entitled Co-operative Planning for Education in 1980, Objectives, Procedures and Priorities,(2) has two basic themes: (a) planning is worthwhile, and (b) goals must be identified. The volume presents a case for the urgency of planning the educational task, and discusses roadblocks to having planning accepted by different levels of the educational establishment.

The last volume, Planning for Effective Utilization of Technology, published in August 1968, summarized a national conference which dealt with various aspects of the emerging technology in education(3). It examined the promise and the problems of the complex relationships between technology and education, introduces the systems approach to the educational process, and recapitulates a series of involved organisational problems in managing change.

In summary, during the last three years the eight-State project has involved a great many people in thinking about the planning process. It has brought together a large number of educators, economists, systems analysts, political scientists, and personnel from State Departments of Education and individual school districts, to sensitize them to the awesome complexities and challenges of planning the future.

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(1) J. Cecil Parker and Raymond A. McGuire, "The Educational Program: Part Two", Ibid., p. 71.

(2) Co-operative Planning for Education in 1980, Objectives, Procedures and Priorities, Report for a Conference of State Representatives,"Designing Education for the Future: An Eight-State Project", Denver, Colorado, January 1968.

(3) Planning for Effective Utilization of Technology in Education, Reports prepared for a National Conference, Designing Education for the Future: An Eight-State Project, Denver, Colorado, August 1968.

III. CONCLUSION

Long-range planning, in order to be effective, must, of necessity, have two facets: (1) a definition of the goals or objectives of the educational system a number of years hence, and (2) an understanding of the technological or organisational changes which may be made to improve the effectiveness or efficiency of the educational process. Long-range planning thus ideally consists of a cut-and-fit process by which different combinations of resources or organisational arrangements are tested to fulfil the objectives of policy planners.

In the most sophisticated constructions, uncertainty about the future values of certain actions may also be taken into account. Given resource constraints, a high-risk-high-payoff policy may be proposed, rather than a low-risk-high-cost policy. The challenge to long-range over short-range planning is that a much wider range of policy alternatives must be examined. Its importance lies precisely in isolating the more attractive policy alternatives, and preparing the groundwork to make them become a reality.

The possible impact of long-range planning on effecting change can be illustrated by the steps needed to follow through from the idea stage to installation on the theoretical insight that early childhood may be the optimal period to equalize cognitive powers. The planner can point out that this finding can be translated into action in a sequence of events: (1) intervention techniques developed and tested, (2) packaged into curricula, (3) trainers of teachers trained, and (4) teachers trained. Only then can effective programmes be started. Or in another case, the use of electronic computers in teaching can reach its full potential only after (1) the scope of individual instruction has been understood, (2) programmes in machine language have been developed to fit different cognitive styles, (3) the content of programmes has been decided upon, (4) organisational changes, and (5) costs of installing the new instructional process have been taken into account.

Careful long-range planning can substantially shorten the process between identification of the need and its implementation by encouraging the performance of a number of steps simultaneously. For instance, it may be possible to train teacher trainers at the same time that curriculum packages are being developed for early childhood programmes. Conversely, long-range planning can cut down on waste; until tested approaches have been identified, training should not take place.

The realization that the increased elbow-room available to education is not being examined with sufficient vigour, and that resources and expertise are not mobilized effectively enough has been implied by President Nixon. In his election campaign he called for the establishment of a long-range planning capability in education, which would examine the needs and the resources, and state clearly the alternatives which can be pursued by educators.

VI

THE PROGRAMME OF THE EDUCATIONAL POLICY RESEARCH CENTER AT SYRACUSE (1969)

by

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I. INTRODUCTION

These notes are specific and limited. They are intended only to make explicit the main features of work underway and projected at the Educational Policy Research Center at Syracuse. They are intended to make that work explicit in relation to the present state of educational planning in the United States. The purpose of the Center's work, its place in educational planning, and its potential importance cannot be assessed independently of some understanding of the planning system for education in the United States and the role of policy studies in that planning system. Therefore, these notes are concerned with:

- the nature of the system for educational planning in the United States and the attitudes toward the future that it engenders;
- the role of policy studies in that system of planning, and
- the efforts of the Educational Policy Research Center.

II. THE EDUCATIONAL PLANNING SYSTEM

If, by "educational planning" we mean the actual formulation of plans that are then formulated in policy and implemented in action, there is very little in the United States that can be called "national educational planning". There simply is no agency or combination of agencies in the United States having that responsibility.

Constitutionally, education within the United States is a responsibility of the states and not the federal government. With only one exception, the legislatures of the states have chosen to carry out this responsibility through local school districts which operate under the authority of a State Department of Education. In most states, though local School Board members are elected by the local community from among residents of the school district, they are technically not local officials. They are officials of the state. In general, the tradition of local control of education is stronger than its legal foundations would justify. Nonetheless, the fact that the authority to educate is lodged in the several states means that there are at least fifty different agencies directly influencing educational planning and implementation in the United States. Moreover, their powers, capacities to act, staffing structure, and authority differ enormously from state to state. In some states, the capacity of the State Education Department to influence the behaviour of local districts is negligible. In other states it is almost complete.

The number of local school districts operating within the various states has declined dramatically in the twenty-five year period since 1945, when there were approximately 100,000 school districts. In 1965, twenty years later, there were less than 26,000. There are currently operating about 20,000 school districts. The variability between districts is even more extreme than the variability of power and function among state authorities. In 1965, local districts ranged in size from the Apache Junction Elementary District in Arizona, which enrolled 300 students in grades 1 to 8,to the New York City District which enrolled 1,074,000. Indeed, the New York City District is itself larger in enrolment, expenditures, and problems than most state units of education. In most of the United States, centralization of control continues. At the same time, the current movement within the major cities is toward decentralization.

When viewed in this legalistic and formal way, the federal role in the system of planning remains fairly limited. About the most that can be done through the auspices of the federal government is to bring controls on the formal educational system by various subsidies - to students, to special programmes, or directly to institutions through the various states - or by policies which influence the shape of the educational system indirectly through the federal tax structure, military policy, urban programmes of various kinds dealing with housing, transportation, etc. Perhaps the most direct ways in which the federal government can control the shape of the educational system is through subsidies to students, for physical facilities, and the support of educational research and development. In general, the tendency is for the federal government to provide assistance to education through the states (at levels below higher education) and to do so for specific categories of activities. As the number of such areas of support grows, however, so-called categorical aid tends to operate in local budgeting processes as though it were blanket or general aid.

To describe in any detail the actual operation of this "system" of governance and planning is obviously a task too large for these notes. But clearly it is a "system" in which authority is very widely distributed. Indeed, it is decentralized to an extent seldom understood even by Americans. Still, the formal arrangements just sketched do not, in fact, set forth anything that can be called the "planning system" for American education.

The actual operation and implementation of the planning function is rendered more complex by some considerations and less complex by others. In the first place, although the number of apparently discrete educational authorities is great, the fact is that they exist in a kind of informal status system. There are some school districts and some states which function as the"leaders" in educational fashions. In order to bring about substantial change in the actual conduct of the American educational system, it is not necessary to influence 20,000 school districts. Fifty to one hundred may suffice. Neither is it essential to change fifty state departments of education to modify the character of educational planning. Thus, the social structure of the educational authorities is itself a simplifying factor. Still, it is by no means a simple task to identify where those influential districts and states may be.

Any description of the "planning system" for American education is complicated, however, by the fact that the formal "educational system" of schools and school authorities is by no means the whole of the "educating system" of American society. It would be a major inaccuracy to study the educational system in the United States and ignore the role of professional associations, informal agencies for adult education, training programmes in industry, the role of military training, innumerable vocational programmes of education conducted outside the authority of local school districts, various trade and business schools and so forth.

Actual enrolment in such formal instructional programmes outside the formal structure of the educational system is, in fact, growing at a faster rate than enrolment within the core institutions of the system. The ratio of enrolment in such "peripheral" programmes has grown from 0.71 in 1950 to 0.82 in 1965. It will probably be 1.02 in 1970 and 1.32 in 1975. If we consider the size of this total"learning force" (including enrolment in the core, together with the peripheral programmes) then it will be substantially larger than the labour force, rising from a ratio of 1.02 in 1960 to a ratio of 1.59 by 1974. Although these remarks have focused primarily on the complexities of describing the "planning system" for lower education, similar remarks will apply also for planning in the area of higher education in the United States.

Given such a complex and distributed system of control, one may legitimately ask whether there exists anything in the United States that can be called a "system for planning" in the area of education. At the Educational Policy Research Center, indeed, we have occasionally found it useful to answer that there is no "planning system" for this enormous enterprise. Given this assumption, however, there remains a remarkable uniformity of practice, curriculum content, administration, physical design of plant and homogeneity of product. Such a paradox can only be explained on the assumption that we are dealing with an enormously complex social system whose behaviour is probably more concealed than revealed by its amorphous legal structure. How is it coordinated, integrated, held together? How can its future be planned? There simply is no single agency or aggregation of agencies whose function it can be to develop long-range national plans for education in the United States. Similar remarks could be made for each of the several states, although that situation is changing somewhat, especially in the states of Florida, New York, Pennsylvania, Texas, Washington and California.

Moreover, the actual behaviour of educational authorities at the state and local levels, and the political and legal constraints under which they operate, make it difficult for systematic long-range planning to develop. In the local districts, budgeting is typically done annually on the basis of tax levies which are adjusted each year and which do not usually respond to the general growth of the economy. At the state level, planning is frequently done for a three-year period; sometimes for five; almost never beyond that period. The time span involved in such plans and the social and political constraints which invariably operate in processes of budgeting make it practically impossible for educational authorities to approach the problems of planning except with the view that the future will be essentially like the present except for modest shifts in inputs to the system involving modest incremental changes, but with little alteration in the structure of the system, or any serious attention to changes in its outputs. There are different attitudes that one can take toward the future. This is the one which most often is represented in the type of planning done at the level of most local educational authorities.

There are other attitudes, however. At the Educational Policy Research Center we have found it useful to consider also what might be called the view of the future as an extrapolation of the present. Most planning in the United States of the middle range is of this type. It involves basically an attempt to identify significant trends that are endogenous to the system itself and extrapolate from those trends in a relatively straight-line projection into a period three to seven years - sometimes ten years. The difficulty is that in such studies relatively little attention is paid to the exogenous forces which will impact upon the structure of the educating system itself. The topics for study usually include need for manpower, including the educational system itself, the level of costs, availability of resources, teacher/pupil ratio in classes, etc. In short, the basic model of thought is that the future will tend to be an extrapolation of the present, with small changes in the significance or function of education, little modification in the structure of the system itself, and usually little consideration as to how other changes or directions in the society might render such projections doubtful, if not irrelevant to the major educational issues of the future.

There are other long-term views of education in the United States which issue basically from what we might call the single alternative view of the future. There are crises in American education, as there are in nearly every other major country of the world. When people are confronted with these crises, it is not at all uncommon for them to formulate a vision of the future characterized chiefly by the absence of the particular crisis they happen to focus upon. Thus, much of the literature dealing with "individualized instruction" in its many forms is clearly related to a supposed crisis in student performance on achievement tests. The movements in the cities toward decentralization is often a response to a crisis in authority of school management, the formulation of a vision of the future based on a school more intimately related to the local community and more responsive to the needs of people in the immediate neighbourhood. Thus, the response to crisis is frequently to shape an attitude and a vision of the future that is different from the present, but different in respect to a single predominant line of change.

Finally, there is that attitude we have come to describe as the comprehensive future. The "New Town" developments in the United States, for example, are usually complex efforts in planning which go far beyond educational planning to consider those elements of the environment for learning and those other institutional arrangements that impinge directly upon the quality of education. This planning is characterized primarily by its complexity. Typically, what such efforts lack is any serious attention to the long-range dimension of time. That is to say, the effort is frequently to bring into existence a totally new town with all its facilities and arrangements for living. But little attention is typically given to potential changes in the social system beyond that point. Such planning, in short, is often not based upon an assessment of a continuing flow of change and development through relatively long periods of time.

The approach of the Educational Policy Research Center is based upon an effort to adopt the complexity of the comprehensive view of the future with the further proviso that we consider alternative comprehensive futures toward which planning might be directed, and also that we consider such "future-casting" always as an approximate description of a state of affairs in constant change over a long period of time. Thus, we are concerned primarily with the assessment of educational policy within the context of alternative sets of scenarios so constructed as to yield some detailed description of educational problems.

III. THE ROLE OF POLICY STUDIES IN THE EDUCATIONAL PLANNING SYSTEM

It should be clearly understood that the Educational Policy Research Center at Syracuse is not engaged in educational planning. It is not a policy-making body. Nor is it in any position to make policy recommendations with the authority to execute them. The EPRC, on the contrary, is concerned primarily to help to elucidate the consequences of policy choices for the formation of one kind of future or another. Policy studies, as conducted by the Center, are not policy recommendations.

Furthermore, the construction of scenarios must be carried on at a level of miscroscopic phenomena usually ignored in educational planning. In other words, we do not believe that the study of the educational system as a macro-social system provides anywhere near an adequate basis for planning. Though it is important, for example, to consider the supply of teachers in relation to the demand for education, still it may be more important to consider the way teachers are organised. It is important to consider the age distribution of students in the population; but it may be more important for educational policy to consider the prevailing structure of the family. If it is true that more formal instruction occurs outside the educational system, it may be more important for the formation of policy to consider what kinds of learning may occur in what kinds of out-of-school settings. When it happens that secondary graduates have spent more time in front of the TV set than they have in the formal school, it may be important to consider as a matter of educational policy the procedures and conditions for licensing broadcasting stations. And so, as a general principle, the efforts of the Educational Policy Research Center at Syracuse are directed toward the assessment of policies affecting the behaviour of the educating system of American society rather than being confined to the behaviour of educational institutions.

Moreover, it is a matter for constant examination whether the existing policy for education in the United States will itself change in the future. We recognize that changes in the educating system of American society will occur incrementally, and that the political process seems admirably designed to guarantee that fact. Still, we are aware that small changes over a substantial period of time may constitute changes in kind. We are willing, in short, to study the policy implications and the social consequences of incremental changes for not just continuing the present arrangements for education but for establishing entirely different arrangements for entirely, or substantially, different purposes. It is at this point that the emphasis on comprehensive futures projected over a long period of time, taking into account alternative possible educational goals, becomes the defining feature of the work of EPRC.

Finally, whereas educational planning in the United States has most often been characterized by an effort to devise those policies that will be appropriate to a future we expect, we are attempting instead to identify those policies which may result in the kind of future that is wanted.

It should be added, finally, that the EPRC is paying increasing attention to the prospect that the study of the future in this comprehensive way, including the use of alternative possible futures, may itself be an important prospective to introduce into the educational process. The study of the future may prove to be one of the few natural ways in which the breadth of the normal academic disciplines with the focus on developing capacities of judgement and choice may creep into the course of study at the levels of secondary and higher education. In short, since we cannot know the future, the question becomes what kind of future do we wish to create, and how can we act to bring it into existence. The focus shifts from the acquisition of knowledge to the formation of choice and good judgement. Along the way, this mode of investigation requires the introduction of most of the skills, concepts, and bodies of information normally associated with the academic disciplines. Thus, developing a capacity to study the future may not be only an essential step for educational planning, but a useful adjunct to the educational process itself.

IV. THE EFFORTS OF THE EDUCATIONAL POLICY RESEARCH CENTER

(A brief account of some salient features of work underway)

Social/Technological Delphi

In co-operation with the Institute for the Future at Middletown, Connecticut, we are conducting a Delphi study of major areas whose future character may affect the shape of education in important ways. A number of experts are now in the process of defining contemporary trends in society, likely change of direction in these trends, and developments which might significantly change those directions. A second Delphi study is concerned with identifying future developments in technology with particular stress on impacts of these developments on society. The Delphi method is a means for arriving at consensus (or eliciting the reasons for dissensus) on matters of judgement concerning the likelihood of events which might occur or be made to occur in the future.

The Future of the Profession, School Organisation, and Systems of Instruction.

Two major policy issues confront American education: the meaning and consequences of individualization of instruction, which is one possible trend in teaching and learning methodologies, and the centralization of school instructional and administrative facilities into educational parks or campuses in kindergarten through grade 12. These two issues have been formulated in a broader context of forecasting and analysing salient trends in the future education complex. This will provide a basis for imbedding various policy choices in these future scenarios and explicating the extent to which their consequences fit or clash. The problem is to identify the points at which trends come into conflict so as to clarify what kinds of trade-offs might now exist among alternative educational strategies. Clearly, certain alternative organisational arrangements in the schools will tend to promote or inhibit certain kinds of instructional systems; and vice versa. Among the contingencies is the character and rate of growth of teacher organisations, including a more precise definition and forecast of what is called teacher militancy. We are attempting to speculate on the interrelationships among a number of possible events in these three areas. This should permit us to study the consequences of alternative educational scenarios, in-school organisation and instructional approaches - in each case matching its effects against a range of educational goals so as to arrive at some estimates of the advantages and disadvantages, social costs and benefits of the alternative choices.

The Federal Role in Post-Secondary Education: Possible Alternative Course of Action

We are currently engaged in an historical, statistical and futures study of the size and character of the learning force, both within and outside formal systems of schooling. This study should begin to reveal the current dimensions of post-secondary education in the United States, of which degree-granting institutions of higher education are only a part. As the learning force grows to include as many and probably more adults than children, important policy questions are raised for the federal government as to the objectives it should seek and the modes of support it should develop in providing assistance to this level of education. Our policy analysis will attempt to identify possible kinds of new educating institutions and activities in post-secondary education and consequences of alternative federal assistance policies within a series of future scenarios.

The Size and Structure of the Education Complex

Work is currently under way, using a systems-analysis approach, to define more precisely the boundaries of the domain of education, including the interactions of research and communications as well as instructional activities, formal and informal, and including the identification of institutional activities not generally considered in the traditional domain. The purpose of this analysis will be to develop a dynamic model of a major macro-system within the society which should enable us to more precisely describe its salient features and trends which must be considered in the formulation of any "surprise-free" scenarios of the educational future. We are attempting to develop "social indicators" in order to uncover hard data which may instruct us on critical dimensions of the total educating activity generally overlooked.

Methods for Formulating Alternative Goals and Specifying Trade-Offs Between Them

The effectiveness of educational policies is often flawed by the fuzziness with which educational goals or objectives are stated. Making use of new developments in semantic logic and futures methodology, we are attempting to develop a framework facilitating the articulation of alternative educational goals in an operational (i.e. measurable) way in a three-dimensional matrix: (1) the levels of aggregation of goals in society; (2) the social points of view they express, and (3) their domain; i.e., fiscal, academic, political, etc. After developing appropriate indicators, the project should develop a method for assessing the trade-offs or opportunity costs among an indefinite number of educational goal mixes.

Part Two

COMMENTARIES ON
COUNTRY PROGRAMME PERSPECTIVES

I

A CRITICAL APPRECIATION: POSSIBLE LINES OF FURTHER DEVELOPMENT IN THE COUNTRY PLANNING PROGRAMMES, COMMENTARIES

by

Prof. Robert Jungk, Technische Universitat Berlin
Prof. Gordon Pask, System Research Ltd., Richmond, Surrey
Prof. Pierre Bertaux, Université de Paris, Faculté des lettres et des sciences humaines (Editor's Note)

The following presents brief written commentaries by Dr. Robert Jungk, Prof. Pierre Bertaux and Dr. Gordon Pask (in reference particularly to Eide, Froomkin and Nishida), organised in order to reveal their main line of argument.

Education Functions in a Complex Relationship to Society

In trying to summarize this relationship, Prof. Pierre Bertaux indicated education's dependent position saying,

> ". . . education is never more than relative to a given type of society, it is merely a cog (however important it may be) in the social machinery constituting that society. Any educational model is therefore in fact dependent (explicitly or, more generally, implicitly) on a given type of society and relates to it."

However, Dr. Pask in examining the question "What constraints shall be placed on the adaptability of the educational system?" described education's inter-dependence with society by a biological analogy:

> "Within a social framework the educational system enjoys much the same status as an enzyme system in a cell (albeit an adaptive enzyme system!). The educational system is particularly similar to a biological catalyst insofar as it partially makes (organises) the society; it is one of the primary social control mechanisms. Conversely, however, the society makes it."

As a consequence of this functional relationship Dr. Pask then pointed to problem of a mismatch between education and society and stressed the fact that this is necessarily a major concern for planning analysis:

> "One advantage of this point of view is that it emphasizes the dangers of mismatch between the educational system and the social system. . . . Dr. Eide points to the alienation of individuals as one unfortunate consequence of such a mismatch. Surely he is right. But it seems to me that a far more general malaise may appear and could readily lead to the breakdown of the social fabric.
>
> ". . . society is a homeostatic system (and must be, if it is to remain a stable, self-organising system). But clearly it is not just homeostatic per se, like a reaction in dynamic equilibrium or a simple controller interacting with its environment. Even in primitive societies the organisation which maintains homeostasis is symbolic and programmatic (population density control, ritual regulation, etc.). In developing societies the "self-consciousness"(1) of the programmes that maintain homeostasis is especially prominent, and these programmes have increasingly the form of traditions (learned conventions) rather than innate conventions as such. Amongst other things education has the function: (i) of establishing the normative (traditional, intellectual, cognitive) systems required for social homeostasis and (ii) of enabling people to learn them and to develop them (social evolution). Now the effect of mismatch between social control programmes is well known. Bateson refers to it as a "Double Bind" situation either between cultures or individuals (in the latter case it is well exhibited in familial schizophrenia). I wish to point out that the difficulties of the "Double Bind" are considerably exacerbated when the underlying mismatch occurs not (as in the classical cases) between existing normative systems but instead (in the case under consideration) between the normative programmatic structure of a community and the educational system which, in the

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(1) In the sense of Christopher Alexander.

> sense of (i) and (ii) generates this structure. In view of the existing degree of mismatch and the currently uniform concept of education it is hardly surprising that student riots are ubiquitous. But they are a fairly minor symptom of a much deeper malady. Remedial treatment should be incorporated in any advanced planning education."

The "Double Bind" situation is not a bad thing in itself. Its existence, like the existence of other conflictual circumstances, may be one of the generators of social development. But an unresolved "Double Bind" may lead to a degenerative situation, either of unproductive stagnation or explosion.

Society and Its Educational System are Evolutionary

However, Prof. Bertaux and Dr. Pask, joined by other commentators, emphasized the evolutionary nature of the social system including education:

> "A viable social organism (all society if you like, the educational sub-culture if you prefer it) is an evolutionary system. . . ." (Pask)

> "The most common assumption - if only because we lack imagination - is that the society of tomorrow will not differ very much from that of today. Worse still, what we believe to be the society of today is really that of yesterday, for we are quite incapable of interpreting the seeds of the future which are even now present in our existing society." (Bertaux)

Society's Goals and Those for Education are Therefore Underspecified

If society is viewed as a self-organising, evolving system, then men in such a system are recognized as in a constant search for goals.

Thus, in commenting on the paper by Mr. K. Nishida, Prof. Pask observed:

> "When, in cybernetic brands of psychology or sociology, man is said to be a goal seeking creature, this phrase should be interpreted quite literally. Man seeks goals. It is in his nature to seek them. He does not necessarily find them and, when he does, he seeks

> others. Life is a search for the bluebird. Of course, we believe in the bluebird; it has psychological reality (I would say it is real). But the search is what matters.
>
> ". . . then it follows that the goals of the social organism are underspecified. As a further consequence, no member of society will be able to state these goals unambiguously in the language of society."

It is meant to suggest a congruence rather than a causative relationship between individual goal-seeking and the underspecification of the goals of society, which consists of individuals and groups whose goals, as far as they are articulated, usually represent some accommodation with each other and with change.

As a Further Consequence Plans Must Be Underspecified

This important observation was congruent with the viewpoints of major contributors to this discussion. For example, see Eide, Nishida, Froomkin. It points towards planning which does not attempt to specify the future but rather contributes to the capacity of people and organisations to make their own futures. Planning is part of a developing symbol system which people create as a guide into the future:

> "As Dr. Nishida points out, there is every justification for imposing rules to guide evolution (self-fulfilment). If man has underspecified goals then he needs a normative framework. Man is evolving into an increasingly symbolic environment. This is the rationale of leisure (labour requirements are handed over to procedural or mechanical artifacts; we interact with them at the level of control signals: symbols). Hence the "circumstances" with which the "self" interacts become increasingly symbolic circumstances, i.e. rules. That the rules, the symbols (or the value systems underlying them) may themselves evolve is really what Dr. Nishida calls his "bold" hypothesis. I do not think this hypothesis is outlandish. Further, I think we must make precisely this sort of assumption . . . in order to explain social stability. But in saying this we have voiced the contention that plans are necessarily built upon evolving goals and are, by their very nature, underspecified prescriptions." (Pask)

First Consequence: Since Plans Must Be Underspecified Planning Techniques Must Be Eclectic

This point was made by Dr. Pask in his commentary on Froomkin's description of American long-term planning:

> ". . . any competent and comprehensive long-range planning activity works in two directions; forward from the present state toward some goal (or class of goals) and backward, from some assumed future state, towards the present state. One reason for this structure is a simple consequence of search theory; the space of possibilities is more readily partitioned by going "backwards" as well as "forwards". Another reason is a good deal more subtle(1). Planning is a partially prescriptive and partially descriptive activity and (in either case) the models employed are oddly mixed; some of them are normative models and some of them (to do with the ecosystem, with resource allocation, etc. etc.) are functional, like the models of physics. The practical result is that a comprehensive planning activity makes use of all (or most) of the five methods cited by Dr. Froomkin. This is no accident and we should be suspicious of any planning scheme which is not so eclectic. (For example, however excellent his equations might be, I would look askance on someone who only uses extrapolative mathematical models.)" (Pask)

One forecasting technique which would in itself embody eclectism if applied to education is "gaming". Prof. Pask summarized its advantages:

> "1. In common with consensus planning and scenario construction it uses human beings to simulate human roles. It is also based upon the same assumption that man has substantially unchanging characteristics and that the variability expected in the future can be elicited, in appropriate circumstances, today. Further, several types of role can be simulated in the same system

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(1) The essential difficulty about planning is that we are part of the system for which the plan is made (thus "man" is easily replaced by "we").

(for example, the future student and the future educator) and the interaction between the participants can be examined. The system is open-ended in the sense that neglected variables, noticed by the participants or subjects are readily incorporated into subsequent versions of the game. Indeed the game can be viewed as a "trap" for catching neglected variables.

2. Unlike other methods, it lays emphasis upon human behaviour (in the system), rather than statements of opinion.
3. Behaviour is sampled at the same level as plan making (the latter alters the systems structure).
4. It is usually possible to pass for extrapolative purposes from the game itself to a computer simulation with "clockwork" subjects but a veridical (isomorphic) simulation of the organisation in which the game is played. The computerised version has the merits and the defects of any mathematical model."

Second Consequence: Since Plans Must Be Underspecified, They Must Deal With the Most Important Substantive Problems

Dr. Jungk in reference to the Eide paper commented:

"My main point relates to the lack of concern in the paper for the quality of future education, which has been mentioned in a rather marginal manner. In the period to come, this factor will be decisive and will no doubt greatly influence any quantitative considerations such as presented by Mr. Eide.

"The following qualities will have to be present in any future educational system:

- increased accent on creativity and discovery,
- increased accent on the permanent exercise of critical faculties,
- increased accent on preparation for participation not only as a citizen but also in the economic sphere, the working environment,
- increased accent on learning how to learn (needed improvements of theory),

- increased accent on teaching of system and synergistic aspects of knowledge ("seeing the whole," "learning how to connect"),
- the future possibilities of educational technology and the limits of such a technology as well as the dangers involved (education industries run by commercial firms or, what would be worse, ideological propagandists),
- the future possibilities of "gaming" as an educational tool,
- the future possibilities of "direct learning" (through travelling and first-hand experience),
- the preparation for coping with conflict,
- the preparation for coping with change,
- the preparation for living in an age of increasing population, and consequently probable overcrowding."

Third Consequence: Since Plans Must Be Underspecified, Planning Must Be Open and Open-Ended

Dr. Jungk illustrated the kind of wide-ranging assumptions which would have to be included in long-term perspective planning for education:

> "In discussing the financial side of the picture, Dr. Eide still seems to see education as it is today, i.e., as a special aspect of life to be "financed". "Futurists" see education in the coming years more and more on the same level as the work we do for a living. The pupil will "go to education" as he now goes to work. He will be paid for his endeavour. In an automated society "education" may become the main activity of millions and millions of people."
>
> "What will be the nature of society or of societies in the year 2000, that is to say, in 30 years? What do we know - what can we know - about it, what efforts are we making to construct at least working assumptions? Any long-term planning work which does not begin by explicitly defining such assumptions is doomed to

> collapse like a building without foundations"

is the way Prof. Bertaux approached this question. He continued:

> "Edgar Faure's law on the orientation of French higher education does at least have the merit of being based on the elements of such an assumption of certain characteristics of the society of the future.
>
> "One datum is certain; present society, which already shows a strong evolutionary trend, will change even more rapidly and more profoundly by 2000 A.D. Let us consider only one statistic: the " period" over which human knowledge doubles (Halbwertszeit des Wissens) which also represents the "period" in which half our knowledge becomes out of date, has decreased from 100 years a century ago to six years in 1960 (University of California estimates). The society of tomorrow must take account above all, in its educational system, of this knowledge renewal rate, and of its renovating effect on the fundamental structures of society (here, in the language of cybernetics, there is a "feedback" or loop effect, which is very complex).
>
> "A second major consideration (or rather constraint) is that by definition the time in educational reform is the generation, i.e. about 25 to 30 years. Education is by definition the most stable and the most inert of all the social systems, the one which evolves (of itself) most slowly. There is no reason a priori why a teacher should teach anything other than what he has learnt, or in any other way than that in which it was taught to him. This is an important cause of hysteresis (inertia, delayed effect) in any reform of educational systems.
>
> "Let us postulate the theoretical case of an educational reform in the abstract: it would only be possible to perceive its real effects when the new educators have themselves been trained as children in the new educational methods, that is to say, at the end of 30 years.
>
> "A contradiction therefore arises from the fact that on the one hand, an educational reform is valid only in relation to a given assumption of what the given

society will be like in 30 years, but on the other hand, it takes 30 years to perceive the results (or mistakes) of an educational system.

"It therefore seems difficult, and theoretically impossible, to follow the old paleotechnical method of "trial, error and correction." (This is one of the major difficulties encountered in the educational methods of socialist countries.)

"What can be done? A whole new approach must be worked out, based on the realization of this contradiction and taking it into account. We can already perceive some of its principles, e.g.:

- not to undertake "a reform", but to put the educational system into a condition of permanent reform, a systematically evolutionary situation, so that it can adapt to the spontaneously evolutionary situation of society. Above all, to create the driving and guiding organism, the "brain" of permanent reform, and to define its techniques of action;
- to tend always to establish "open" systems, i.e. with as little predetermination as possible, capable of different orientations. For instance, to develop possibilities to the maximum and to reduce predetermination and premature generalization to the minimum; not only to tolerate, but to encourage educational experiment; not to try to apply a centralized "Napoleonic" system;
- to endeavour at all costs to provide adult training and lifelong education; to teach teachers to retrain themselves continually. (I find an appalling inertia in this field.)

"Lastly, it must not be forgetten that education, however well-intentioned it may be, is a conditioning of the human being, a manipulation of his personality. The technical means of such conditioning or manipulation have now increased considerably and are tending to be used constantly. The trend is towards increasing action in depth on the personality of the subject (I almost said the victim) of education - action at the level

> of the subconscious, the unconscious, and the reflexes; constant pressure from TV, advertising, or the fabricated environment. Educational technology is thus evolving towards a considerable increase in its effectiveness, and the responsibility of the educationists and the reformers is correspondingly greater. May they realize it . . ."

recognizing the need to follow these kinds of principles so that people may participate in educational reform rather than succumb to educational change.

II

EDUCATIONAL PLANNING AND EDUCATIONAL RESEARCH: SOME UNSTATED ASSUMPTIONS

by

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I. INTRODUCTION

What can an outsider, obviously not himself a specialist in education, educational research, or educational planning, say about the impressive work currently being carried out in planning divisions of Ministries of Education in the developed countries? I think the answer to this is not to try to engage in a debate as an amateur educator, riding some favourite pedagogical hobby-horses. There are other people in these fields much more qualified for that type of activity. But what an outsider can do is to try to extricate from these writings a number (ten to be precise) of unstated assumptions, axioms so to speak, that are not really questioned and nevertheless have an important bearing on the result. It is hoped that it may be possible thus to see the general educational enterprise and the specifics of planning in a broader perspective.

To direct the attention to "unstated assumptions" does not mean that one necessarily accepts what is being done within the framework provided by present explicit assumptions. Thus, much could be said about planning that seems to assume that lectures will continue unabated as a major way of disseminating knowledge - prolonging its defiance through five centuries of the art of printing. Much could also be said about planning that seems to assume that examinations will continue essentially as before as methods of stimulating and testing pupils and students - prolonging their defiance of libraries and reference books as somewhat superior to human memory. Of course, with practically no books around he who had knowledge ought to memorise and orate and he who did not have knowledge ought to demonstrate that knowledge had been transferred and adequately stored. Human beings were used as walking books and ambulant libraries and it is a rather telling indictment on educational institutions that this pattern still lingers to a large extent. The emphasis is still on absorbing and retaining knowledge rather than on creating it. But much of this can be, and is being, changed within the existing paradigm of education. In this paper an effort will be made to make this paradigm more explicit not on reforming it.

It should be emphasized that although this may look like a destructive and critical pursuit it is certainly not intended as such, nor does it have to be so in its consequences. Each generation has to ask new questions, and new questions mean precisely that the unquestionable is doubted. This does not necessarily mean that it is rejected: it only means that one tries to gain insight by seeing what is a special case of an infinite number of possibilities. The world is rich, man is rich, the future is even richer. But this richness is only ours as long as we are able to see it, as long as that which is stands out as just one point on the spectrum of that which might be.

II. THE ASSUMPTION THAT RESEARCH IS THE ANSWER

To do this one has to start at one point, so why not start at the very beginning, with the concepts of research and planning themselves. It may sound very strange to people who have diligently acquired insight into these techniques, some of them mathematically quite involved, time consuming, highly data-requiring and in addition often difficult to get across to politicians, to realize that they are now being rather vigorously attacked from the left. Research and planning used to be some of the slogans of the left, one generation or so ago - is it really true that the political spectrum has now moved so far in general to the left that this is no longer the case?

What has happened is probably rather the simple thing that there is a world of difference between a programme of research and planning and the reality of planning. As long as something is in the programmatic stage contra-arguments are usually forgotten, for three simple reasons. First, one is so engaged in arguing against that which one wants to supersede that one has a tendency to develop a rather simplistic black-and-white picture: what one suggests is only good, what is going to replace it merely bad. Second, one simply does not have the empirical insight: once something has been realized, contra-arguments may become more evident. They may be of two kinds: one may become more sensitive to the virtues of the replaced system, and one may have such glaring examples of the vices of the new system that it is hard to disregard them. And third, there is the problem of a new generation. A new generation grows up in need of new slogans, for fights between ideologies are very often a superstructure of rationalization constructed over a solid conflict of generations, of angry young men wanting to replace the old ones and to justify their fight in terms of new thinking. Let us look at some of these arguments.

When it comes to research it is usually said that the purpose of research is to find Truth. One enters a fascinating and complex empirical world with the sharpened instruments of the newly developed social sciences in order to arrive at statements that can stand up against the challenge from data; statements that are tenable because they are verified. I think nobody in his right mind will deny the importance of this type of research. Whenever a new experiment in education is carried out it is of unquestionable relevance to ask the simple question: does this new institution in fact live up to its promises? Does it do what it is supposed to do? A non-empirical attitude in such matters leads to dogmatism, to a priorism, armchair philosophy, and often also to lack of sensitivity to fundamental democratic values. Research has very often been a way of exploring the darker corners and the hidden facets of society and also of letting the underdog present his views.

But once this is being said, one should not close one's eyes to the darker side. To do empirical research by definition means to look backward in time, to concentrate on the past - for the simple reason that only the past has produced data that can be fed into empirical research, however theoretical it may be. But this means that attention concentrates on what already is or has been, and in the big machineries the world has seen for education this means that attention focuses on the implementation of ideas that are already somewhat old. More particularly, it is hardly realistic to believe that the research agency of a Ministry of Education will do research, in general, on educational institutions that represent efforts to practise ideas that are less than, say, 30-40 years old - for such at least is the gestation period of an idea in a social organism with some inertia. Add to this the fact that empirical research itself is a highly time-requiring activity, and you end up with a considerable time lag between creative thinking and evaluation.

However, more important than this is a more subtle argument. Science is an institutionalized search for truth, and the idea is that there is one and only one truth. In other words, truth is supposed to unify, and data are supposed to be the final arbiters in debates. It is easily seen how this enters in a basically political field as education undoubtedly is: as an effort to arrive at the "scientific answer" that may be used to gloss over or even bridge completely important ideological debates and value discrepancies. The assumption is that one should be able to create a class of research-minded administrators who have the scientific answer to questions. And it is also easily seen that this ties in with the idea of a nation-wide system of education. For even if it is true that values divide, this would not in itself be problematic if one were able to have one educational system for each major educational ideology. But since the idea is that one should combine ideological diversity in the field of education with institutional unity a unifying concept is needed, and this is precisely where Science and Truth enter the picture.

Let me immediately add that nothing of what is said here is an argument against doing research; it is only an argument against only doing research. Research is indispensable and has a most sobering effect: it forces the investigator to concentrate on even the most unpleasant aspects of the reality, particularly if it is carried out in a completely free and questioning manner. But it seems to be an activity that is not without its implicit dangers because of its backward-oriented tendency, and there is also the question of whether it is not an activity with a rather limited utility. Research may uncover unpleasant aspects, or pleasant ones for that matter, of reality. But it does not in itself lead to any idea about what the future should be like. As will be pointed out below one cannot from data from the past alone infer anything at all about the future. For that purpose different things are needed: a clear conception of the values one wants to realize, a tremendous amount of imagination as to educational structures that may satisfy those values, and also, very basically, theories that may justify the assumptions. In empirical research neither values nor suggestions about new structures enter, and theories may come as a consequence of empirical research but are not in and by themselves part of it.

A conclusion is that it seems that what institutions for educational research and planning would need in addition to researchers would be highly imaginative generalists with a futuristic orientation. They would of course work in close co-operation with researchers and administrators but would be more at hand just as idea-makers than loyally bound and tied to the constraints set by empirical research methods. And one may therefore legitimately ask: where are these people in the Ministries? It is not sufficient to say that this is the task of politicians, for the training a politician receives is very often of questionable relevance. It is not so much that he may never have had any intimate contact with an educational establishment apart from the minimum he has had to go through in his own society. It is rather that his training may consist in such elements as working his way upward in the party machinery or in the national institutional network; both tremendously meaningful in terms of knowing how to handle men, groups and ideas, but not necessarily stimulating in terms of developing images of what the future of education could be like. A new brand or breed of people are needed for this purpose, and not only in Ministries of Education but certainly in our machineries for running society in general.

III. THE ASSUMPTION THAT PLANNING IS THE ANSWER

Some might believe that planning would be the answer to this. However, one so often hears from planners and government officials in general that they "do not have the time to really start thinking". This is hardly a correct statement. It is not for lack of time that what is produced often appears unimaginative, it may also be because of recruitment patterns that filter out people with excessive imagination from the very beginning. And it may be because there is no intrinsic reward put on imagination, exactly because the products emerging from imaginative speculation may in themselves be so threatening and controversial as to split rather than unify.

Hence, planning often emerges as an answer that kills imagination but permits one to think a couple of years ahead, or even as far as 1990 for that matter, on a basis which is as uncontroversial as possible. One concrete way of obtaining that is essentially to do the following. A list of supply factors and of demand factors in the institution, *in casu* education, is prepared and one looks at trends in the past for these factors. One then extrapolates as long into the future as one thinks one can reasonably proceed, and develops a number of alternative projections both on the supply and on the demand sides. And then one builds on the general assumption that it is good for society to be *balanced* - in other words that supply should equal demand - subtracts extrapolated supply from extrapolated demand, and if there is a positive difference it is called a *programme*. Thus, one may predict the number of school-age children using demographical expertise and the number of available teachers and classrooms using existing supply programmes, and look at the balance sheet for years ahead.

Nobody in his right mind will deny the administrative significance and importance of such approaches. One has to be able to foretell, to anticipate, to plan for tomorrow. And there is hardly a planner today who is so naive as to assume that extrapolation is the same as prediction. First of all, he will know very well that the prediction itself interferes with reality; it may become self-denying or self-fulfilling. If he should predict and have the pleasure of being proved right he would at least have to keep his prediction secret - in which case it would not be useful for planning that at least had to be made known to some key persons. And second, there is the fundamental and implicit assumption that society in the future is basically going to be a continuation of society in the past, only with a little bit more of this (or much more for that matter) or a little bit less (or much less) of that.

It is probably not too much to say that this is an assumption that has been carried into the social sciences by rather uncritical imitation of natural sciences. In the natural sciences we have usually had the basic idea that Nature is strong and Man is weak so that the best we can do is to Know Nature, be able to have insight into the invariances or laws of Nature, so as to be able to predict and perhaps even be able to manipulate by riding on such invariances into the future. What we can never hope is to be able to change the laws of Nature.

Assumptions of this kind are hardly valid for the social scientist. Although we are probably not able to do anything we may want, we should not in general expect that the future will be a replication of the past. The coupling mechanisms in the social system are not that strong, neither across space at the same point in time, nor over time. Rather, what seems to be the case is that there are leaps and jumps and discontinuous transformations in the social order, that what was impossible yesterday may become possible tomorrow - and this itself often runs counter to the concept of prediction. For prediction is exclusion, it is a way of saying that something and not something else will be the case tomorrow and the day after tomorrow. Hence to predict is often not only conservatism in the sense that one permits the past to throw a much too dominating shadow into the future but also anti-pluralism in the sense that of the total range of possibilities only a limited number are selected for serious attention. Since Man, and particularly rational Man, will tend to act upon his predictions, the publication of the prediction will then tend to reinforce both tendencies.

In short, what one would have against planning would not so much be that predictions may be shown wrong or that interesting possibilities are excluded from serious attention. It is rather that long-term planning will take place on the basis of the variables considered relevant and important yesterday. It will not be sensitive to the circumstance that these variables may shade into oblivion, that other factors may gain salience and that controversies of the past may be completely transcended and yield to new controversies. This has always been the case in the past. There is little reason to believe that the paradigms within which current educational planning takes place are the final ones in the history of Man, so that one can permit oneself to extrapolate any number of years into the future, feeling that all problems have been adequately mapped and that the problem remaining is only that of finding an optimum solution.

In short, one may even go so far as to say that long-term planning is an absurdity. It is certainly not absurd to plan some years ahead, but to plan in the sense of really translating predictions into action consequences one generation ahead only reveals lack of insight into how social change seems to take place. And this lack of insight is related to exactly the topic of this paper: the question of the unstated assumption. For what we know from the past and shall possibly witness with increasing speed in the future is that assumptions taken for granted by one generation are questioned by the next, and that this will make even the most carefully exercised planning recede into the oblivion it will so amply deserve.

Actually, it should perhaps at this point also be mentioned that alternative plans are of no avail in this connection, no matter how laudable they may otherwise be. For this is not a problem of whether the birth rate will be this or that in the future, leading to contingency planning because of highly discrepant extrapolation curves on the demand side; it may for instance be a question of whether children will continue to go to school at all, or whether schools as we know them will continue to exist.

IV. ASSUMPTIONS ABOUT THE HUMAN LIFE CYCLE

So, let us look more closely at one of these unstated social assumptions. So far in human history we have based our institution building more or less on the following simple divisions of the human life cycle into four parts: first, a period referred to as Childhood, second, a period referred to as Education, third a period referred to as Work, and fourth, a period referred to as Retirement. One is born into the family where one spends one's childhood, is then given education in a broad sense partly by one's family and partly by society at large, is then requested to convert this input into an output to society and to one's family in the form of work, and then retires into the family again (this time usually the family of one's own creation) until one finally dies. There is a simple logic to this scheme: the cycle probably looks as obvious and as uncontroversial as day and night, or as the laws of motion and the law of gravitation for that matter.

Yet, it is very far from obvious. Actually, there are at least three assumptions underlying this scheme: (1) a very low entropy in the distribution of these four different types of existence during the human life cycle because the life cycle is divided into four neatly separated categories with no overlap or mutual interpenetration; (2) the idea of a certain time order, that Childhood comes before Education which comes before Work which comes before Retirement, and (3) the idea that this formula should apply to everybody, should be universal.

However, even today this cycle is not only being questioned but already exposed to tremendously strong forces of change. Education penetrates into Childhood in the form of kindergarten; Childhood penetrates into Education in the form of play schools; Education penetrates into Work in the form of adult education, weekend courses, vacation courses, on-the-job training courses, after education courses and whatnot. Work penetrates into Retirement in the form of extra jobs for retired people, and Retirement even penetrates into Work but, significantly enough, only for a particular elite in society: I am thinking of the sabbatical year given to professors at most universities. In other words, the entropy is increasing because of interpenetration, even the time order is relaxed a little bit and people are more inclined to compose their own life-cycle recipes. In other words again, what people do starts looking a little bit more like the way people behave in well-assorted restaurants when they order food, and in well-equipped shops when they buy clothes, and less like what is being done to them in prisons where both food and clothes are heavily standardized, leaving no option when it comes to spacing, timing and composition.

Imagine that we now postulate as a general principle for looking into the future that there will be more of a need, an urge, even a direct demand for variety and individually selected life styles. The old pattern referred to above will be thrown out, and people will require more individually composed educational programmes. And by that we are not thinking in terms of what they want to learn or how they want to learn it, but to a large extent in terms of when they want to learn. In the affluent societies now emerging it is certainly not unimaginable that people may demand the right to mix these four types of existence any way they like, for instance by starting with a couple of Childhood years, then perhaps a year of Work, then five years of Education, then two years of Retirement followed by one year of Work, then ten more years of Education, and then a mixture of Work, Education and Retirement until death. One could imagine that the society with scarce resources could say something like this to the inhabitants: "Look, if you live till you are eighty we give you the right to have five years of unimpeded Childhood, twenty years of Education, fifteen years of Retirement, all together forty years - and we would ask you to put in forty years of work." In the future the latter will of course not be according to an 8-hour day in a five or six-day week in a 47-49 week year but rather, perhaps a four-hour day in a 3-4 day week something like 30 weeks a year. Many formulas could here be imagined, but the important thing would be that the freedom of the individual to time and space his own life cycle would have rather revolutionary effects on the educational establishments we have today.

V. THE ONE PERSON - ONE JOB ASSUMPTION

And this leads us straight into another unstated assumption: the idea of training an individual essentially for one job. Of course, one starts out with the assumption that he should first be given general education, and then gradually be narrowed down to a highly specialized education that delivers him perfectly shaped and fit for his particular niche in a society highly marked by division of labour. But this assumption overlooks completely that it is possible to have division of work without lasting division of people. The functions of a shepherd, a fisherman and a literary critic (to use Marx's examples) may be retained even if one no longer assumes that persons can be identified as shepherds, fishermen and literary critics: they may simply rotate.

More precisely, people may want to diversify their work diachronically by changing jobs in the middle of their life cycle, and not only by promotion within the same branch, but by a complete change in branch and sector. And they may want to diversify synchronically by holding more than one job at a time. The question then becomes: how does one make a set of educational institutions geared to this type of future society where people can no longer be safely assumed to belong in one occupational category but want the maximum flexibility and mobility and want to be prepared for this because they see this not only as a source of enrichment in their own life, but also as a way of making societies much more transparent to them so that they will be less alienated and less subjected to manipulation, and as a way of eliminating some of the harshest effects of social stratification?

VI. THE ASSUMPTION THAT TEACHERS KNOW MORE THAN THEIR STUDENTS

And this leads one straight into the next assumption which seems to permeate all educational research and planning that is likely to come out of Ministries of Education for some years to come: the idea that teachers know more than their pupils, that professors know more than their students. This idea is certainly valid under a number of assumptions and has certainly also to a large extent been valid in the past. And it is well known that the idea has been and still is used as a justification of the power differential between the two in schools and in universities. Teachers decide over pupils and professors over students and not vice-versa because the former are presumed to know more than the latter. But this assumption is already being challenged, and will probably be increasingly dubious in the future.

So far this is most clearly seen in the field of tertiary education, in the universities and the professional high schools, in other words in relations between professors and students. There are many factors that enter this picture. First, there is the famous knowledge revolution: it is said that 100 years ago it took 100 years to double existing human knowledge, today this time period is reduced to 6 years. This means that a professor twenty years older than his students will have to catch up with three such doubling periods. There is certainly a question of whether he is able to do it: the students can go straight to the most recent books, often available very cheaply in paperback editions whereas in the older ages the professor had a virtual monopoly; and the full professor is heavily constrained in his reading by family obligations, administrative details he has to attend to and a feeling of have a back-log of literature even back to his own days as a student that he has not taken seriously enough.

But there is a second aspect of this that is much more important: it is not so much the quantitative accumulation of knowledge since the time when the professor was a student that matters as the qualitative jumps in the direction of accumulating knowledge, Thomas Kuhn in his very important work on scientific revolutions has pointed to the importance of changing paradigms in the sciences: what was important and relevant yesterday may no longer be so today, and there may be a new change of paradigm again tomorrow. One generation may conceive of Nature in this way, the next generation in a completely different way, and the same certainly applies to the way in which society is made a topic of investigation. It is difficult to say how often these changes of paradigms take place, but if it is as often as the half-time of knowledge then the poor professor is not only three doubling periods behind, but also three paradigms behind his students. This means that he will be perceived as relevant enough to be placed in a museum as a representative of past thinking, but also sufficiently irrelevant to be of no major significance to "his" students.

One may object to this that the professor may catch up not only with the new literature within his field and within his own paradigm, within the frame of reference in which he is used to be operating, but also with scientific revolutions. This may be the case, but experience seems to indicate that it does not happen too often. There may be many reasons for this, and we shall only point to three of them.

First, the professor has already made his frame of reference, trained himself in a paradigm or even contributed to establishing one; it is hard for him to change and also hard not to pursue the interesting problems that he is able to define within that paradigm. This is what he knows, this is what he commands, and above all this is what intellectually really fascinates him. He may even tell his students, and probably will increasingly do so the more he is procrastinated: "Yes, place me in a museum, that is perfectly all right as long as I can carry on with my research."

Second, there is the question as to whether there is something brain physiological or otherwise physiological that would provide some basis for believing that a certain rigidity, "sclerosis", sets in somewhere between the ages of 20 and 30. We probably do not know very much about it, but we know sufficiently to be able to say that this is a most important problem and that it is hoped that brain physiology will become a major auxiliary discipline to education in the near future. Rigidity may have its physiological basis, and if so this would certainly argue against the predominance of the older generation.

Third, there is the equally basic influence that probably can be derived from social structure. We have indicated that the professor may be well established in his paradigm and the student may be searching for his own. But the same applies to the problem of work: the professor is established in his job, the student is searching for his. In other words, there may be an important correlation at work here making certain mental habits a mirror image of the respective social situations of the professor and the students. And this in turn may be a reflection of the low entropy in the life cycle referred to above. The student is located at the fascinating borderline between Education and Work: he is in a period of change and transition, whereas the professor has settled down, by definition. But imagine that this entropy is increased significantly, making the life situation of the professor much more similar to the situation of the student: is it then unreasonable to believe that the psychological situation and the attitudes and habits when it comes to scientific thinking would also change considerably? In fact, we would be inclined to believe that this structural factor is more important than the psychological and physiological factors mentioned above - particularly if we add to it the importance of the classical pattern of training a person for one job only. Diachronic and synchronic diversity combined with low life cycle entropy would have a most upsetting and unsettling effect, and hence tend to equalize the life perspectives on both sides of the teaching relations.

It should perhaps be added that students in particular, but perhaps also pupils in general, today seem to live much more diversified lives than did their knowledge superiors: they certainly mix elements of Childhood, Education, Work and Retirement into patterns that for their elders often seem most abusive, frivolous and even repulsive. To the extent that this is the case it will also tend to reduce the distance in experience between the two: diversity will compensate for age. And if one adds to this that youngsters today are perhaps as much as three years older physiologically speaking than their superiors were at the same age, and that they have been exposed to much better educational institutions and hence are much better trained than their superiors were at the same age, one may sometimes wonder whether the relation has not to some extent been reversed. In some countries this is certainly the case: in some developing countries it is painfully obvious that the best students are far ahead of even good professors, and this leads to terrible strains in the whole educational establishment. This is *a fortiori* the case in periods when a science undergoes paradigmatic change so that it is highly vulnerable, and the assumptions made by the older generation are questioned collectively by the younger. There is hardly such a thing as an intrinsic division between "hard sciences" and "soft sciences" with professors of hard sciences retaining their knowledge superiority whereas those in the soft sciences have to fight for their power status. Rather, there seems to be an important division between hard and soft *periods* in the life of any science; that even sociology may in periods appear pretty hard and physics rather soft. The soft periods are the periods of crisis and they are perhaps the most fascinating periods, and perhaps even the periods where real gains are made but this does not seem to take place without considerable strife between the generations for the reasons mentioned above.

VII. THE ASSUMPTION THAT TEACHERS SHOULD HAVE MORE POWER THAN STUDENTS

Another assumption that certainly is questioned today is the idea that the teacher not only knows more than his pupils but also shall have more power than his pupils, and correspondingly for the professor and to the students. At this point, one may sometimes have the uneasy feeling that educational planners work as if the student revolution of the last few years had not taken place at all. One may have endless debates as to what the student revolution is about, but there are some basic points in this connection that must be made explicit since their negation often enters as unstated assumptions.

That a decreasing knowledge gap, particularly in periods of paradigmatic change, should be accompanied by a demand for a decreasing power gap is very natural, particularly because knowledge differentials have been used to justify power differentials. But there is more to it than this. It is not only a question of doubts about the legitimacy of the power-holders, but also a question of doubts about that particular power structure even if the old claims for legitimacy were valid. And here one may say that what the students are not merely asking for, but demanding and taking many places around the world, is not necessarily much more than 1789 in European history. They reject the social order where one class can decide in secret sessions over the fate of another class. They want a transparent social order, without secret meetings, with the right to listen and see, to speak and to be heard and to participate in decisions.

If one now believes that life in an educational institution should serve as some kind of preparation for life in society at large, then it seems strange to maintain a completely feudal order in education as a "preparation" for a democratic order in society at large. To suggest that this wave towards defeudalisation can be stopped or even reversed only betrays lack of realism; and planning that does not somehow incorporate this basic variable, which now already belongs to the past, seems *a fortiori* unrealistic. And this brings one back to the problem of the structure of planning in general. Of course, the planner of yesterday and of today has had difficulties in balancing between pure researchers on the one hand and pure administrators on the other. He may have wanted too much: both to be respectable in the eyes of the researchers and to be influential and meaningful to the administrators, and may perhaps sometimes have failed in the eyes of both or at least of one.

But the answer to this cannot be found only in terms of some horizontal integration of certain élite positions selected from the top of the total educational establishment, by making for better co-operation between researchers, planners, administrators and politicians. It also calls for vertical integration and co-decision of a type which we are not very well trained for. Those who are being planned, the young, the pupils, the students, ask with full right and justification what they are being planned for. They question a lot of assumptions about our society in general and our national causes in particular, and know perfectly well that the educational establishment is an important instrument for any government or any nation state. They refuse to accept that planners only play essentially innocent roles, making alternatives known to administrators and making them anticipate future problems, they see them rather as manipulators playing their own strategic games, having their own axes to grind and their own power positions to maintain. They ask, and with complete justification, who plans the planner when the planner wants to plan everybody else?

VIII. ASSUMPTIONS AS TO OWNERSHIP OF MAJOR EDUCATIONAL INSTITUTIONS

There is little doubt that still another unstated assumption in this effort is the assumption that the major educational establishments will still belong to the nation states in the future. Of course, one knows that specialized institutions and training are often in the hands of other organisations, but the assumption is that this should not apply to general, comprehensive education. However, this is not so obvious. There are certainly contenders for this tremendously important power position in any social structure. Why should not inter-governmental organisations such as O.E.C.D. or UNESCO have their own universities? Why should not international non-governmental organisations, such as the International Social Science Council, give major training? International and national business organisations already do, why should this not also apply to non-profit making organisations? And if this is demanded for supra-national bodies why not also for sub-national bodies? If the nation state has the right to disseminate training why does this not also apply to nationwide associations such as trade-unions, and to nationwide organisations such as major corporations? It should be pointed out that this is not the same as regional diversity or the diversity found within federations. The idea is rather that our age is witnessing a tremendous increase in the number and salience of non-territorial actors as opposed to the classical, territorial actors such as nation states, provinces, districts, municipalities - and possibly also future regional superstates. This fight between the non-territorial and territorial actors for ascendency in major matters has just only begun, and there are reasons to expect that it will be increasingly vigorous in the future, even to the point of becoming a major concern towards the end of the century. There will almost definitely be fighting over the right to educate, which means that Ministries of Education may expect challenges almost from any supra-national and sub-national actor.

There is also another, and to our mind very important, argument against treating the nation-state as a unit in a supply-demand system. It treats the nation-state as a closed system. But it is very well known that some nations, among them OECD Members, have a demand far beyond any short-term or even long-term supply. And there are nations that could relatively easily produce a supply of educated people (among them people to educate others, teachers) more than sufficient for their own demand. In fact, the situation is very similar to the food situation; there are foci of over-production and under-production. Is it any better to stop educating people than to stop producing food, just because the needs of one's own nation-state are adequately provided for? What is needed is a world view, world analysis of supply and demand, world institutions of planning and educational operations, world flows of resources much less impeded by national borders than today. What national planning may have contributed to less privileged districts, true world planning must contribute to less privileged nations.

IX. THE ASSUMPTIONS THAT EDUCATIONAL INSTITUTIONS ONLY SERVE EDUCATION

For this leads us straight into another basic assumption: the assumption that the major task carried out by an educational institution is education as such. Of course, one then conceives of education very broadly: it is not only the question of imparting knowledge and skills, but also of catering to the whole personality, to his creativity, his emotional self, his social self, and so on.

But this assumption is certainly not valid, even with this broad definition. Education is like the part of the iceberg that shows; a much greater part is less visible. Educational institutions serve to disseminate certain ideologies. They serve to brainwash the pupils and the students in a certain direction rather than in others, to disseminate myths about the past, definitions of the present and images of the future - and above all to disseminate shared myths, definitions and images. The idea is to a large extent to homogenise, to make citizens in one common nation state, to make individuals who can work together within one particular setting. For a nation state to have loyal citizens it probably has to disperse services to some extent and get loyalty in return, but to make citizens at all, it has to socialize them into a common mould. This is what the educational establishment does, and other actors on the national and international scene craving for attention and identification with themselves would also like to have access to people's minds through such forceful institutions.

But to this should be added still another factor which seems to be even more important. Education seems to do the same to human beings as prices do to commodities. It serves as a tag on the individual so that one knows his value: this one is worth seven years, that one is worth nine and that one again is worth twenty years (of education). Education is a price mechanism, and serves to indicate who can be substituted for whom. When somebody leaves a job, retires or dies, the educational institution provides society with a mechanism that makes it possible to know where to look: replaceability should no longer be in terms of same family background, same sex, same age, same race or something of that kind, but in terms of somebody with the same education. Education establishes equivalence classes or substitutability classes.

That also means that education is among the factors in society that makes for the high level of replaceability or substitutability so characteristic of modern, industrialized societies. All over society in the modern world people know only too well that they are highly replaceable; that others with the same education could do exactly the same and in exactly the same way. This means that people are highly detachable, that they can be detached from their work product, from the people with whom they work in the same organisation and consequently also from themselves. And this seems to be the basic element in alienation, even to the point of saying that the structural basis for alienation is substitutability. But that does not mean that any type of educational institution is alienating. They are only alienating insofar as they establish these equivalence classes so that one is led to say that one individual is equal to another individual. And behind this again one sees busy administrators engaged in something they call "co-ordination"; seeing to it that school A offers a diploma that is equivalent to school B, that the same is the case for university X relative to university Y, not to mention nation I relative to nation II. In this perspective centralized educational establishments, for instance in Ministries of Education, do not only become dangerous because they tend to be conservative, nationalistic and anti-pluralistic, not to mention too hierarchial and powerful at the centre; they also become dangerous precisely to the extent that they are successful (if by success we mean exact comparability) in ensuring that the education received is worth the same regardless of where it is obtained.

Fortunately, it is easy to imagine some changes that would decrease the range of substitutability considerably. Thus, one might imagine a much much higher degree of variation in the composition of individually selected educational menus. The American college system is one example here, an approximation, and with all its defects very useful as a reminder and an illustration. Another example would be the possibility of enormous variations when it comes to the composition of life styles and life cycles, mentioned above. If we now combined these two principles of variation it could almost certainly be said that no two individuals would look exactly alike. This means that replacement would never be complete; it would always bring in a new element - the successor would always be able to bring something new and different to the job. But it is equally obvious that this is not only a question of organisation of education, but also a question of organisation of work, a problem we shall not attempt to take up here.

What can be mentioned, however, is the importance of educational variation within the system. We mentioned above the implicit assumption of training a person for one job, his life job. This assumption is being challenged by diachronic and synchronic variation, and precisely the same can be said in connection with educational institutions. It is hardly audacious to predict that an increasing number of students will not only change universities in the middle of their studies, but also, perhaps, tend to study at more than one university at the same time. They can do so to a large extent because they live in an affluent society with sufficient means of communication at their disposal, but also because they want variety and challenge. But, needless to say, even if financial means and the general communications situation make it possible to choose and combine, selection of novel combinations will only be meaningful as long as educational establishments are sufficiently different. If they are all co-ordinated down to the smallest detail so that they teach the same in the same way nothing will be gained, except in perhaps purely social terms, from circulation.

Hence, it is very much to be hoped that central authorities of education plan for diversity rather than for unity, that they do not think that there is such a thing as the ideal university and the ideal school but offer a range of choices. For it is to be expected that in the not-too-distant future even the elementary school pupil may behave pretty much like a student today in terms of switching from one school to the other and perhaps enjoying in a parallel fashion the knowledge and general education given at several elementary schools at the same time.

If this sounds incredible to many, one should again point to some of the factors mentioned above: early physiological maturation, extremely easy and cheap access to competitors when it comes to disseminating knowledge - TV is of course the most important example here - and increasing detachment from the parental generation. Of course, youth in general and students in particular have always rejected their parents and masters during puberty and at later stages of their lives, claiming that they have been deceived, that the father is a God who failed, and so on. What is typical today is only that this is a shared, collective rejection, partly due to increased knowledge, partly to the education revolution, indeed due to the much better possibilities for organising revolt present in a communication-oriented society, and above all due to mutual visibility and transparency in a society with excellent mass media. What was once private individualized revolt within the families is now a shared, collective concern. And this may easily lead a society into a stratification and even complete splitting in terms of age groups; a social order for which we are also completely untrained.

X. THE ASSUMPTION THAT CO-OPERATION MEANS UNIFORMITY

In this perspective an unstated assumption about activities of intergovernmental organisations in this field should also be discussed. It is somehow taken for granted that it is good for Member States to be co-ordinated and harmonized. The intergovernmental organisation does this not only by making visible to Member State A what Member State B is doing so as to disseminate good ideas and institutions from the more developed to the less developed ones; they also do it by taking initiatives of their own. But since all Member States have first class membership the organisation has to disseminate the same to all of them; this is merely justice, by definition.

But it may not for that reason be what is most needed and wanted in the modern world. It may well be that what we really want and need is diversity rather than co-ordinated harmony and substitutability. This may also require the machinery of an intergovernmental organisation but a quite different philosophy when it comes to the meaning of co-operation. Co-operation would mean to plan for diversity, to plan for options and unknown and new combinations. There is no point in establishing a limited set of combinations available from eternity to eternity, the only meaningful thing is to establish a system with maximal potential for changing its own range of meangingful combinations.

To phrase it in terms of the single individual: fulfilment in human life does not seem to lie in technical perfection in one particular skill alone. This would have been true if human beings were much poorer, much less many-faceted than they seem to be. But human beings are rich, many-sided, they change all the time, are different from each other, and very often inconsistent. Any educational system that tries to serve them one type of dish alone, and hence does not take this into consideration, will either be doomed to challenge and revolt or, through repression, create highly impoverished individuals.

XI. THE ASSUMPTION THAT THE RECEIVERS WILL BE GRATEFUL TO THE SENDERS OF EDUCATION

This leads us to what perhaps is the final assumption in this whole exercise: the idea that people really want education and that they will be grateful to those who provide it. This is a rather naive assumption. It is strange to observe today the extent to which parents, teachers and professors are astonished when the younger generation seems to turn against them. Here they have been working on the slogans of "education for democracy", of "knowledge for independence" and should feel tremendous pride because the results have been so successful: knowledge has really been converted into independent stands, and education is really being transformed into a design for democracy. But instead there is disappointment, resentment and outright hatred. It looks as if the only revolutions the older generation is able to accept are the revolutions of the past, and one may really ask whether Ministries of Education in general and planning divisions in particular would have been able to recognize, to appreciate, and above all to incorporate a Comenius, a Montessori or a Pestalozzi if they arrived on the scene today. Of course, the same question can be asked of any institution. For instance, would the state church or the official church of an average nation state have accepted Jesus Christ or some other religious founder if he had arrived on the scene today? The answer is of course no: for what is typical of these people is precisely that they instituted new paradigms. Theirs was not the quantitative change, some little added piece within an accepted framework, but the substitution of one framework of thinking and acting for another.

It may well be that one such framework for the future will be decreased demand for education of any kind; a general rejection of the whole idea of education. Or maybe there will be a much stronger identification of education with living as such, that not only the borderlines between the stages in the life cycles will be blurred, or the hierarchies of teaching with teachers and professors on top etc. will be demolished; it may also be that education and life in general will blend so perfectly that there will be no distinguishable difference between them. It may also be that education is a thing that should not be handed out through schools as we know them, but rather be at the disposal of citizens at all stages of their life cycles, much like restaurants. They will of course have to be heavily, perhaps entirely subsidized in order to avoid class difference in accessibility, but basically they would be there when they were called upon and should be able to cater to the most diversified needs. Moreover, the services offered by one could be highly different from those offered by another, and a maximum degree of "shopping around" could be not only encouraged but easily implemented.

As a matter of fact, one might even discuss whether it might be a good idea to decentralize the school system so much that anyone who had a reasonably good idea for a new school could start one, and even at government expense. This is certainly not unprecedented. In fact, this is the way science is run in a great number of countries today. Scientific research councils exist and receive applications. Of course, they also stimulate and even direct, but much of the philosophy and the structure have as an important nucleus the idea of free and local initiative. Of course, resources cannot be given away indiscriminately: there has to be some kind of screening board, some committee. But this screening board would stimulate diversity rather than denigrate it, and would support any initiative consistent with a minimum set of standards - as in the case of scientific councils.

Of course, this would not represent the complete solution to any of the problems mentioned above. The members of the committee in a scientific council are not intrinsically more up-to-date, more change-oriented and less anti-pluralistic than the top administration in a ministry. But if the committee is suitably constituted with due regard to differences and above all to age differences, something highly valuable might be expected to emerge. It should also be mentioned in that connection that it seems highly important to have on such committees people who are not specialists in education but who are in the category of "generally wise men and women". For those who doubt the importance of such measures it might be fruitful to remember that a young Dane once applied for money for some investigations from a private Danish research council and was turned down by all the experts on the board. He was accepted by the non-expert brewer after whom a foundation was named, moreover because that brewer seemed to be endowed with some particular human insight. The applicant's name, by the way, was Niels Bohr.

The general idea behind these last paragraphs is that we may be heading for the future with an increasing detachment between national governments and individual education. Nothing is eternal in this world, and nation states are no exception, nor their Ministries of Education, nor the planning divisions of the latter, nor the futurists commenting on them. What is highly useful in one period of human history may be a liability in another. Individuals may become so disenchanted with their nations and their nation's governments that they increasingly refuse to become socialized to them. The whole idea of knowledge and skills may appear absurd, the idea of meaning and development of rich inner life as well as rich inter-personal relations may stand out as infinitely more significant. This may call for really new thinking, but even more for complete restructuring of our educational institutions.

XII. CONCLUSION

However, we are not yet qyite at this point today. We have seen symptoms of anti-intellectualism and the fight against knowledge, but we have not yet entered and perhaps never shall, enter an era where these are the predominant themes. But even if this unquestioned assumption, that knowledge is at all valuable, may still not be up for questioning we feel that the others mentioned in this paper already are, and already have been for quite some time. To the extent that this is the case it should be reflected in papers on education, particularly in papers on planning of education, and especially when they aim as long ahead as the 1990's. If not, it becomes suspiciously close to the attitude of the French aristocracy at the end of the 1780's: *What is this noise in the streets?* But societies progress by being sensitive to that "noise" for it is a signal that ordinary channels of communication and decisions do not function. Efforts to repress, or to absorb completely, to integrate by means of small accommodating measures, may postpone changes for a while. But it seems much more likely that what we are witnessing today are the labour pains prior to the birth of new educational institutions, not some cosmetic operation to be carried out on a system no longer compatible with the new social orders that are emerging.

III

PLANNING AND SOCIAL-EDUCATIONAL CHANGE

by

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I. THE COUNTRY PLANNING EFFORTS AND THREE DILEMMAS OF EDUCATIONAL PLANNING

I was personally very impressed by the country reports, especially by the two attempts at long-term perspectives (Norway and the Netherlands). They show great sophistication and maturity, and I am sure that many of you are quite lonesome and lonely in your own departments. I wonder whether the so-called experts here are not in many respects therefore good dialogue partners, better dialogue partners than many of your fellow bureaucrats back home.

However, as a political scientist I would like to emphasize that the dilemma facing planners inside policy-making organisations are enormous. My understanding is that planners are actually confronted with trying to stabilize, trying to facilitate decisions for peaceful static conditions in which a plan decided upon can indeed be carried out, in which the outputs conform to the inputs, while at the same time they are actually agents of change. As planners you are in a sense co-responsible for that so-called turmoil that we have aptly referred to as a cultural revolution.

The insights gained by short-term educational planning - in which great expertise exists now in over a dozen countries - I would not want to slight these insights in any manner. They are important in terms of establishing priorities, in terms of getting some of the problems resolved, problems such as school buildings, the ratio of students and teachers, the additional technical resources required, etc. Yet, it seems that mass education, or compulsory mass education, of modern man, can no longer rest satisfied at that level of insight. The first and perhaps most serious difficulty at this level of approach is that it is not responsive to the changes actually occurring due to this input. To put it another way, planning is efficiently changing a situation which was previously often haphazardly attended to from year to year. The feedback from this situation - trained manpower, educated young people in millions - this feedback is not taken into account in the short-term educational plans. And my reading of the documents shows me very little evidence that it is being taken into account in the long-term programmes. Yet it is very essential that one must develop a technique by which these feedbacks can be taken into account. In economics of course this is so. Economic planning has gone through a number of very laborious and very disappointing experiences and has come to rest with a dynamic model where feedbacks, in some cases, daily feedbacks, are once more taken into account.

Secondly, it seems that planning staffs organised for this current form of educational planning, efficient, and, I like to repeat, welcome as they are, lack responsiveness in the policy-making realm. That is, they lack elasticity; they are not elastic enough to influence the policy-makers, after the feedback has been recognized in its totality, to change their policies. Rather, there is a chronological sickness. The four-year, the five-year, the seven-year planning period has to come to a close before such a new policy decision can be made, or a new election has to take place, or another composition of the staff has to be awaited, possibly the demise of the minister or something of that nature. Meanwhile, what are educated people, whether youngsters or adults, actually doing? If they have taken the educational opportunities seriously, they will confront the world with that which they have acquired and they themselves become the creators of changes. How can ministries, how can organisations (I am not here referring solely to the nation states, I am also thinking in terms of international organisations, business organisations, any organisation for that matter) be responsive enough to these changes which are especially due to various educational advances they have been successful in bringing about?

The third question is, I think, a very serious one which any of us involved one way or another in education have to face: The history of the present educational system shows that its demise is here. That is, its end is at hand. The system has become a subsystem of a larger informal educational system. In some countries the formal educational system is already the minority in terms of input and of resources applied. In terms of members participating, the old system is already the minority of all those engaged both as recipient and as well as givers in the educational process, and the new system is of course only part of what I would like to term a total ecological political system which is evolving in the industrial mass society, characterized by the demise of nation states and the appearance of regional, continental and all kinds of new organisations. This overall political ecological system responds as any ecological system would to a large number of triggers, one might say. They are social/economic, they are philosophical/cultural, but I think the most important, the most interesting trigger in this new situation is man himself. Man himself who is quite unpredictable. We may in our studies once more, in our research once more, get hold of him and understand him, but at the moment he is quite unpredictable.

Just as a signal and a footnote to this idea, notice recent events in Austria. The Austrians have been very active in promoting not only among their own staff in the ministry but among the public this new concept that education has some positive relationship to the economy. What is the meaning of the public response in the form of a referendum in which the people defeated so to speak a very rational, very acceptable development plan? In short, they said "We don't want more formal education for our children." However, did this mean that they are opposed to the learning experience? I think not. There is opposition, in other words then, to the schools, and there is a very serious crisis of trust in the scholastic system as such. Coming from humans, the challenge is here not from interest groups, not from political groups, not from any of the various component parts of the society, but from the amorphous mass of humans who, and I might add here, have all made good grades, who have studied well. The very confronters, the very protestors are not the poor and intellectually backward ones, but the ones who have done excellently and have indeed seen through the system as such.

In advanced countries then, the formal education system known as the school is headed for demise, as is also the community known as the community of scholars. We find today an increasing number of scholars who are no longer in any sense at all attached to schools. I had a very interesting experience a number of weeks ago: The Chase Manhattan Bank in New York trains, at the post-graduate training level, not just young Americans (I met many young Frenchmen there and other Europeans) in a manner that I would say tops some of the best business schools in the world. Yet, this is not a faculty, this is not a university, this is not a post-graduate institute. This is a very pragmatic training course for people interested in international finance. People teaching there, a good number of them, have never been professors, and they wouldn't care to be; they are simply experts in various aspects of the far-flung banking enterprise. So the scholarly world, as we have known it in the last few centuries, is coming to an end.

II. THE IMPACT OF SOCIAL CHANGES AND SOCIAL INVENTIONS ON EDUCATION

What then is the major challenge coming from humans who are the products of a very enlightened, very sophisticated, very efficient educational system? The real challenge here is to bring education, the learning process, once more down to the proportions of humaneness, the proportion of relevance, to the proportion of everyday challenges that these humans are experiencing. We speak here of the substance of social change, for which the school and education has been one of the major agents. There are two main aspects of social change: first, its autonomous development which I have already briefly sketched, as a result, in a sense a feedback result, of education. The second aspect is the non-autonomous or guided development of social change. That social change can be guided in significant ways immediately raises the question: In what direction? We must face the problems of goals and the programmes to meet them. Here, perhaps more than anywhere else, the bureaucrats of organisations will have to show their mettle. Are they going to be capable of envisaging a number of alternatives to which social change might be guided or are they going to be, to use an expressive Americanism, behind the eight ball? That is, will they be more and more impacted and become less and less effective in terms of giving guidance to the social change?

Educated People as Change Agents

In whatever way the organisation people meet this challenge, social change is a fact, one of the most fascinating of our time. The old educational system, the sub-system of the larger one that we see and observe today, really did not have to be cognizant of social change because its chief output was to supply a number of professions to a relatively stable society or community. These were the professions of the Middle Ages in a sense, the priests, the doctors, the lawyers. The professions actually needed for the operation of society gradually multiplied as the middle class and the working class and finally the peasants began to participate.

A problem, of course, arose very challengingly since not everybody could become a doctor, a lawyer, even a businessman, or an engineer. There had to be something else in education, and this was considered to be the humanistic content of education - to give people a common experience of tradition, and an experience reflecting what others have thought in the past. By the turn of this century this form of education in advanced industrial countries became insufficient and led to a third emphasis on vocational training for life.

However, life has not stood still; it has in fact moved in unexpected ways. A symbolic and very striking example is that of the "A" student who caused a successful chemical against obesity to be taken off the market. Being an "A" student he knew what that chemical was composed of and made it one of the most potent student drugs by dissolving it and taking it in injections, and therefore it had to be withdrawn from the market. This is symbolic of the present product of our educational systems: it includes the professional know-how, the humanistic background, the vocational training to be able to make something out of one's life. Now all this is being superseded by innovations even by the younger members of the educated community. The head of the pedagogical section of the Russian Academy of Sciences told a group of us a few months ago that: "We in the Soviet Union should not be against youth, their criticisms, all the same criticisms that you can hear in the West. We should indeed give them medals because they have made 'A' grade. They have really, truly studied!" So rebellious students, obstreperous apprentices, in a sense, unreliable peasant boys in our society, East and West, are learning a lesson and they are going beyond the three component parts of the old educational sub-system. They are able to think critically and, in a sense, creatively.

Leisure

There are other causes, of course, of social change. Important among these is the psychological basis of individual innovation which involves the individual creativeness of a leisure-time situation. Even if countries today still have long working hours, compared with previous societies, we have a leisure phenomenon as never before to which I find very little, too little, reference in the country educational perspectives presented here. At the moment, the emphasis seems to be that the time put in by young or old in the acquisition of knowledge is an economic factor of sorts. This cost-benefit viewpoint is a very important contribution. However, a much more important question, it seems to me, is what people are doing with an increasing amount of leisure time. It may amount to only an hour or two hours a day more - and the shift is not as rapid as some prognoses had indicated - but it is in this leisure time that there is great potential creativity. I hate to say that even much crime is a creative activity, particularly in that its increase is a reflection of the increasing leisure capacity of the society. There is an enormous potential creativity among millions, hundreds of millions of people, who did not exist in previous cultures and previous civilisations - potential which at the moment is going in all kinds of anarchic directions.

Communication Replaces Transportation

A third aspect of social change here that we seem to neglect is that electronics are replacing territorial mobility, that is, direct communication is replacing transportation as the basic way human beings obtain information. Communication satellites in terms of their present very limited use have already shown, for example, that the moon ventures with all the trimmings of scientific, economic, political, social, cultural explanations have reached hundreds of millions of people - people hardly prepared to even understand what was going on but who nevertheless gained a genuine educational experience. Anybody who has talked on buses, subways, trains, planes, to people about this will be amazed to find a rather sophisticated knowledge, not a semi-intellectual knowledge, a rather sophisticated knowledge, in terms of the statistics involved. Like the people who can remember football scores, very simple people are able to remember distances involved, inputs, outputs, all kinds of figures. If direct communication replaces transportation, so to speak, for human beings to obtain information then those involved in educational planning will have to make much larger allocations of resources in this direction. Equalizing formula, equating students, teachers, buildings, libraries, and other gadgets of the formal educational system will be less relevant than much greater investment in informal education. By this new emphasis the entire educational system may take on a new structure to replace its present anarchy.

Pluralisation of Education

All levels of education are being rapidly eroded by a large number of social inventions, and this begins with compulsory education. Increasingly, parents keep children out of school, parents compact to form new schools, private schools as they are called in some countries. Adults compact with and require the educational services of organisations that really have nothing to do with education ministries, and young people break off education no longer just through summer work, but for a January interim, a whole year off, two years off, getting genuine experience in the practical world and life experience more closely connected with personal life cycles. Now, in the normal "innovations" in the education world, these events are called aberrations, abnormal. They are being corrected by laws and the closing of loopholes in laws and yet this development is not being stopped. In fact, breakthroughs have occurred in as much as certain educational institutions, say that what happened to be the wrong thing yesterday, namely to take off a year and work, is precisely what a student ought to be doing. Or that an apprentice after he has finished and is on the lathe should be sent by his organisation to take a year and catch up and learn.

The even greater educational innovations taking place outside the formal education system are in work organisations of all kinds and in professional associations. There are invisible colleges, you might say, invisible colleges very relevant to the problems confronting man in the real world. They are more relevant in their scientific communications, I dare say, than many a school. They are very free to foster interdisciplinary co-operation and approaches because it is precisely at the interfaces of all disciplines that the new insights and the new solutions are being formed.

Like banks and warehouses and stockbrokers, etc. libraries can now benefit from automations and from advanced techniques of storing and retrieving. Just think what the Xerox revolution has done in terms of getting information around. The new role to be played by the libraries, cathedrals of tomorrow, is transmitting information free to anybody. It cannot be even gauged at the moment. And here again national libraries, libraries sponsored by the state, are often three or four years behind in their acquisitions; they are useless in the sense that they cannot produce the answers and their retrieval system is outmoded. In response, small independent libraries crop up, a large number of them, in fact, and so the innovation takes on the character of a pluralisation of educational efforts.

The pluralisation of educational efforts changes the educational society which was the great hope of the nineteenth century and which is, in a sense, coming to fruition in the short-term plans of education ministries and in long-term development programmes. This educational society has already changed into a learning society. And a learning society, the members of a learning society, will take their information, their communication, their help for meeting life, anywhere they can get it.

III. THE IMPACT OF SOCIAL CHANGE ON EDUCATIONAL PLANNING

What possible lessons can be drawn? And how do we now as planners, responsible to the governors of society and others who are responsible towards the innovation of and the structuring of insights, how do we, in a sense, remain in a dialogue. The main thrust of this first attempt here in the OECD must certainly be continued. I believe this can be facilitated by our joining in the recognition and the attempt to understand the widespread social innovations already taking place under our very noses.

Social change does not require blueprints in terms of where certain actions will end. Rather, it requires wide social guideposts, and descriptions of interrelationships among certain policy decisions, and resource investments. Furthermore, and here perhaps is the most critical and crucial point, these must be a devolution of planning and a devolution of decision-making down to the lower levels because information already is at the lower levels. Information is not a monopoly, information is there at the lower levels, but planning, decision-making, involvement, participation, are not at the lower levels. If planning groups within organisations are raised to a mediaeval, sacrosanct role, we suddenly have high priests, we have mandarins, we have in a sense a byzantine situation. The other side of such a byzantine situation is that it is, we know very well, only effective and successful for a very short time in a dynamic society.

I am in a sense optimistic about the adaptation, the adaptability component in organisations, to meet this change. I am very pessimistic and concerned about something that has not been mentioned at all in the discussion. Namely, that we are losing sight of the only value which makes this flourishing of education worthwhile, the value of democracy. I see in the lack of communication between those responsible for the governing of men and those thinking about the present implications for the future, I see here real dangers. I see them in the enormous enthusiasm given to what forty to fifty years ago was indeed a very progressive enterprise - planning. This very thing has however become a rather conservative enterprise, dangerous to democracy and to democratic ideas. I see in this lack of social awareness how planning today is a belated tool to support the freeing of man. I see a great deal of lip service paid to a libertarian society, and I see structures being built up almost blindly, almost unconsciously, which will do everything but maintain this libertarian society. In conclusion, therefore, it seems odd for one who has been involved in planning and in perspective development to warn against planning. Perhaps the economists can give us a lesson here. They are beginning to be very careful when they talk about plans. At best they will commit themselves to sectoral planning, to one sector with a very clear need to be met, and a very clear problem which - with all its indicators and parameters and variables can be measured. They will then dare to say here we can establish a plan with all the provisions of feedback corrections. We will pursue this plan for three, four, five, seven years, whatever the instance might be. A sectoral plan.

But we should become, I think, extremely hesitant to talk about long-term planning. In fact, I think long-term planning is a total misnomer. At best we can talk about long-term developments. Perspectives is already a very difficult word, as we do not have enough indicators to do justice to even such a term as perspectives. Indeed we can do and we ought to do a great deal to spread an atmosphere of openness towards various developmental patterns, towards various developmental surprises. We can as educators officially and professionally say, here indeed we need more research and more knowledge, and then we might attempt to resolve its specific needs in planning terms. So my concluding proposal would be not only to change the name but the very consciousness, the social consciousness involved here. Perhaps OECD more than the national states can be an instrument of change, can innovate, but above all I think we ought to think in terms of enormous research efforts and not so much efforts in planning.

Part Three

PERSPECTIVES AND METHODOLOGY

I

EDUCATIONAL PROBLEMS OF FUTURE SOCIETY

by

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I. APPROACHES TO FUTURE EDUCATIONAL PROBLEMS

The basic assumption of this paper is that man is a thinking and working creature who attempts at all times to realize himself by acting within a given set of circumstances, and who equates the "fullness" of his life to his success in this attempt. The fullness of life is therefore determined by interactions between the "ego", or self, and the circumstances in which it must be fulfilled. Accordingly, it has a dual structure consisting of two elements: one belongs to the world of subjective consciousness, the other to that of objective reality.

The extent to which the fullness of life can be realized depends upon three factors: (1) under what circumstances, (2) with what aims, (3) in what ways man acts within given circumstances to achieve aims. The first factor is "given", i.e. determined by society, but the other two are determined exclusively by the individual. While the action of an individual is undeniably conditioned by the first factor, it has nevertheless been found to vary greatly under the same circumstances. "Education" may therefore be defined as those activities designed to influence the subjective consciousness of man so as to make possible greater self-fulfilment, assuming a given set of circumstances.

Turning to the fundamental structure of a "problem", it seems to me that a problem arises only when we become conscious of a discrepancy between what we expect and what we find. We see no problem so long as we lack an idealistic attitude of what to expect, or remain in a state of ignorance which prohibits cognizance of what we find.

A consideration of educational problems of the future therefore means an attempt, first, to foresee what will be the circumstances of the individual in future society and, secondly, to decide, given these circumstances, what activities should be pursued in order to maximize his opportunity for self-fulfilment. Finally, we need to understand clearly what has already been achieved through education, what we expect for the future and how we can best realize these expectations.

I shall consider, first, what subjective conditions the individual will need in future society, secondly, the scientific methodological problems concerned with how to develop an effective education to meet the needs of that society and, thirdly, what kind of educational system should be built into future society in order to enable every individual to benefit from an education adapted to the necessities of the future. Therefore, my consideration of future problems for education will be from three different approaches: teleological, methodological and systematological.

II. TELEOLOGICAL PROBLEMS FOR EDUCATION

1. The necessity to adapt education to individual needs

The human being plays a dual role in the economy: as a consumer he is the final object of economic activity; as a labourer he is a productive means of economic activity. In the early stages of economic development the number of people depending upon social wealth was relatively excessive compared with the total amount of wealth produced, and employment opportunities with incomes sufficient for reproduction of the labour force were scarce. People were required to be good labourers in order to secure employment and have the opportunity to work for higher incomes.

In these times the utility of education was simply the acquisition of knowledge and skills to increase the labour productivity of the educated. The school systems developed for the effective transmission of such knowledge and skills; they functioned therefore as mechanisms to facilitate the social and economic ranking of people through a grading system based on the evaluation of a pupil's acquisition of this knowledge and these skills.

Even during the times when labour supply was plentiful, the social value of formal education was never questioned so long as other means were found to identify and foster the "élite". Education in Japan during the hundred years following the beginning of the Meiji, when an extraordinary national effort was made to reduce Japan's backwardness vis-à-vis other advanced countries, can be compared to a running march of an entire nation toward higher standards of living for its people. Certainly the national energy accumulated through such an extensive development of human abilities has been a powerful force in the rapid development of the Japanese economy during the last few years.

Today, Japan is characterized by a relative scarcity of labour. Technological innovation has transformed the production structure of the secondary industries into a capital-intensive one; however, expansion of the tertiary industry has not yet ceased to absorb human resources from other industries. The volume of the gross national product depends upon two factors: the size of the active labour force and its productivity. If this is so, it is very probable that, as the relative decrease of the working-age population continues to grow, economic growth in Japan will become increasingly dependent upon the advancement of the labour productivity of the entire working population.

In such cases, the task of education is to develop those abilities of various kinds which can contribute to the enrichment of human lives, and not to educate an "élite", as in the Period of Enlightenment. It is not an education centred around the teaching of a common formal curriculum to rank people into superior and inferior groups, but an education to identify and develop the multifarious potential abilities of all people.

In the more advanced stages of economic development, the demands of education become increasingly what has been deemed an ideal. As a result of the present social demands for the development of human abilities, the individualization of education is being accelerated rapidly.

2. The necessity to educate an independent autonomous personality

The economic development of society has contributed to a great extent to the elimination of various obstacles to the realization of a full life. Not only has it made a direct material contribution to the people but also it has served as a powerful weapon against ignorance and illness. Some people even dreamed of the coming of "utopia" after their victory over such social evils.

However, realities do not appear to be so simple. It was thought that once despotism, warfare, poverty and ignorance were eradicated, only ideal government, peace, a welfare society and wisdom would remain. But this remained a great disillusionment. The mere elimination of such hindering factors, although necessary, was not sufficient for the realization of the fullness of human lives.

I think it is meaningless to conceive of an eschatological "utopia" as a stage in the development of society because of the intrinsic nature of an individual to enjoy the fullness of life only through his own endeavours. It is a paradox that, for the majority of human beings, self-fulfilment was possible only through their own struggles with various obstacles of their times. This is, I think, an intrinsic nature common to all living creatures.

The acceleration of economic growth will, in future, free even more people from the restraints of labour to pursue their own desires. However, as man's endeavours to adapt himself to the lack of this freedom fostered such virtues as diligence and moderation, we may well wonder what will result from the extension of such freedom in future society.

I, myself, cannot believe that man is a living creature with so high a degree of morality that he will not fall into indolence and self-destruction once all institutional constraints on diligence and moderation in society have been eliminated. I think therefore that, in parallel with the extension of freedom, there is a need to design new functions of co-ordination.

After all, future society will proceed with an expansion of man's freedom. The most important tasks of education will be to educate people, first, to use surplus time and money effectively for self-fulfilment and, secondly, to assume social responsibilities for their enjoyment of freedom and to control and integrate themselves.

Here again, the changes in circumstances as the result of economic development permit more attention to be given to the "personality", the development of which has always been considered the intrinsic objective of education. Whereas in the past the utility of education lay in the improving of labour ability, in the future the utility of education will be measured by the accomplishment of these intrinsic objectives. The essential objective will be to educate people to make independent judgments on how, and for what purpose, they should live and fulfil their own expectations. Man's freedom in future society will depend upon the extent to which education succeeds in achieving these objectives.

3. The necessity to educate a practical-minded organisation man

Industrialization in Japan during the last hundred years absorbed a large percentage of the rural population into cities and suburbs: the agricultural sector of the total working population decreased from 70 per cent to 20 per cent. "Urbanization" is the process of the reorganisation of these groups of people who have become detached from their lands and are being absorbed into social organisations which have different functions. Urban communities, thus reorganised, are different from unicellular rural ones in that, in the former, societies are dissolved into contract relations classified by purpose and reorganised into organisms with high dimensions. In cities, individual people can break away from human relations which have been fixed by tradition, custom and blood; as free citizens, they may join organisations of their choice. Only in cities, I think, can people enjoy social freedom in the true sense of the term.

This process of transition has been generally regarded as one aspect of social progress. However, a new kind of frustration has begun to be felt, the seriousness of which may increase in the future: the tendency of social organisations, expected to guarantee people the freedom of living rational lives, to swallow the individual, free, constituent members and exert their powerful influences like gigantic monsters. After repeated failures in the attempts of monsterisation of the large organisations called national states, man has created a political system of democracy as a mechanism for the self-government of free people. It is difficult to say that they have achieved a complete success in this system of control. Today there seems to be a growing interdependence between organisations such as commercial firms, schools, labour unions, self-government associations, professional organisations and local organisations.

If the natural direction of social development is toward the pluralization of social powers and authorities, the relations between organisations and individuals will probably become increasingly serious in the future as urbanization continues.

When we review the past achievements of education, we find that almost nothing has been done to alleviate this problem. I fear that very few people are even aware of the great challenge it presents to education.

In view of these changes in circumstances, two serious deficiencies appear in the subjective conditions of man. Notwithstanding such fundamental changes in social organisations as described above, there still persists in man a strong yearning for human blood-related groups, and people are not yet prepared to adapt themselves to the modern society of contracts. This is a very favourable condition for those who want to benefit from the monsterisation of social organisations.

A second deficiency is that, in coping with this organisation problem, people are almost ignorant of the physiological conditions necessary to enable a healthy functioning of relations between organisations and individuals. Accordingly, they simply bring into organisations the sincerity which is honoured only among individuals, and the only result is a waste of their efforts. They are not equipped with techniques to manage productively the relations between organisations and individuals.

The "expert" whom future society requires is not the intellectual demanded at present, but a new type of practical-minded organisation man.

III. METHODOLOGICAL PROBLEMS FOR EDUCATION

1. Educational technology as a means of individualizing education

The individualization of education means an education organised to develop to the maximum the potential abilities of each individual; it is, in fact, nothing but the ideal of education and few people oppose it. However, the progress which education has made in this direction, when compared with the voices of its advocates, may not be so striking.

There are two important circumstances which have hindered the progress of the individualization of education. First, it is very difficult to define and grasp objectively individual differences which can easily be recognized by intuition and experience. Secondly, the school systems have, up to now, offered little opportunity for individual guidance of pupils. There is very little possibility that these two conditions will change considerably in the future; on the contrary, with the quantitative expansion of educational systems, the difficulties are likely to increase.

It will not be so easy to reach even a theoretical conclusion on how to recognize aptitudes and abilities of individuals at the various stages of their development. Even if some satisfactory methods are found, it might be impossible for all teachers, most of whom are nothing more than average people, to apply them to their pupils who will reach the seven-figure mark.

An appropriate approach by the education system to the individualization of education is, I think, not to give an objective definition of individual aptitude and ability but to grasp operationally the characteristics of the various stages of development of an individual. For example, suppose there are a limited number of questions appropriate for analysing multifarious characteristics of human abilities. If we give each individual a level of systematic intellectual training immediately higher than his stage of development, we can then assess how much progress has been made by his ability of intellectual operation. In this case, profiles at various points in time can be regarded as individual characteristics, and trends in the changes of profiles through stages as aptitudes of the individual.

If a system for the transmission of knowledge adapted to individuals' responses to set questions could be designed, it is very probable that the systematic operation of such intellectual training would be performed by a computer far more accurately than by a man. With the introduction of educational technology, the work of teachers will be to interpret and diagnose individual pupils' characteristics recorded by computers and to choose types of education and training appropriate to the various tages of development of individual pupils.

2. The formation of value-consciousness as a factor of an independent personality

If an individual in future society, enjoying a surplus of time and income as a result of economic growth and feeling no external pressures for diligence and moderation, is able to find for himself his own goal for self-fulfilment and attempt to attain this goal and enjoy the fullness of life, he must have the ability to make appropriate and effective use of his freedom in subjective activities. It is the individual value-consciousness that will give direction to man's subjective activities in future society.

I have a very bold hypothesis to make on value-consciousness:

Through our experience of living, we come to understand the meaning of human activities and, at the same time, to perceive the ideas which these activities represent. And through our experiences with material things we come to know not only individual values but also antagonistic relationships among them, and to understand the practical meaning of our choice of values. Through such processes, every individual establishes a pattern of choice and builds up his own system of values adapted to his personality.

The system of values thus built up is of a very personal nature, differing according to individual processes of formation. It is being continuously reconstructed through new experiences but, at the same time, tends in some circumstances to take on a very rigid character often biased towards egocentricity.

A possible approach to the formation of value-consciousness may be found in the field of counselling. Experiences belong originally to the individuals involved. Generally speaking, however, it is not easy for a person to consider the meaning of experience, to recognize objectively his own position entangled in impulses and interests and, by doing so, to deepen his power of introspection. In this process of self-reflection, I think that conversations made possible through educational relations have powerful intermediary functions. Educationalists who participate in such conversations must have an analytical grasp of the process of the formation of value-consciousness and know the techniques of conversation which are effective and useful in deepening the self-reflections of the student. These are the people who can be called professional teachers in the truest sense of the term.

This counselling function is the subject of a new field of specialization for teachers. Heretofore, counselling has been regarded purely as a psychological technique but, in the counselling which deals with the value-consciousness, "value-orientation" becomes a very important problem. Therefore, one of the most important tasks of education in the future will be to develop effective methods of value-orientation and to make full use of them in the educational systems.

3. Methods of teaching and guidance for developing ability in social activities

Intellectual training is not sufficient to enable us to acquire the ability to understand fully the relations between individuals and organisations and to conceive of ourselves as organisation-men. This is possible only by reflecting upon our own behaviour in social situations in which we are always pressed for our own decisions and actions. The importance of such a learning process is not the experience itself but the process of reflecting upon its meaning and of raising one's actions to the level of self-consciousness. The practical role of education is to serve as an intermediary in this type of learning process.

Thorough studies have not yet been made on the meaning of this practical role of education nor on the methodologies for its fulfilment. One of the reasons is that the modern educational system has tended to confine the teaching profession to a kind of *circle* which has kept teachers away from social practices.

In recent years, the importance of voluntary activities of pupils has been increasingly recognized in the educational systems, and group activities are now generating great interest. However, most teachers, having been trained only in traditional methods of instruction, have little knowledge of how to direct group activities. Some teachers believe that by not interfering in pupils' activities they strengthen the pupils' independence and help to develop their social personalities. But to think that doing nothing is the most educational action is to abandon education. In fact, these teachers do not even know what kind of abilities are acquired through group activities.

There are three cultural requirements of a democratic organisation-man. First, he must have realized the meaning of the rights and responsibilities of individuals through his own experience of individual/organisation relations. Secondly, he must have learned the conditions necessary for the healthy functioning of group organisations as well as those under which organisations begin to show pathological symptoms. And lastly, he must have the technical knowledge of the processes and methods of solving problems through group activities.

The main functions of education in this respect are, first, to provide the opportunity for individual voluntary activities which contribute to the learning experience and, secondly, to offer intermediary help to the pupil in evaluating his own experiences. The meaning and importance of educational counselling and guidance in the performance of these functions is not yet understood and little attention is being given to the necessity for professional and technical training of counsellors.

IV. SYSTEMATOLOGICAL PROBLEMS FOR EDUCATION

Since the beginning of the nineteenth century schools have held the most important place among social institutions concerned with education. In recent years, however, various deficiencies and limitations are beginning to be pointed out in schools. The circumstances which account for this trend are numerous:

(i) During the Period of Enlightenment the school's task was the creation and transmission of knowledge and techniques, and it enjoyed a superior position. Today, when society creates and disseminates knowledge without the aid of schools, the task of the school has become one of preparing its pupils for future participation in social activities, and this task is becoming increasingly impossible.

(ii) Past experience has shown that there are three types of knowledge: (1) that for basic training of early youth; (2) that which can be acquired or fully understood only after a certain degree of maturity and experience; (3) that for timely learning according to the occurrence of practical needs. It is wasteful to attempt to impart all three types by formal education.

(iii) Not only is basic education necessary for youth as preparation for its becoming a responsible part of society, but there is also need of the adult who, having already accumulated considerable experience, needs educational assistance to help him adapt to a rapidly-changing environment. Full-time educational institutions accommodating a particular age-group only cannot meet this need.

To offer the educational opportunities necessary for meeting the social needs of future society, and especially for resolving the future teleological and methodological problems for education, a systematic re-shaping of the entire system of education and training, including social education, under a unified principle of organisation would be necessary.

I would like to think of this principle of organisation as a combination of three factors:

(i) Forms of education: the kind of educational conditions required for the diversity of educational instruction.

(ii) Objectives of education: the kind of education and training necessary for people of various ages, occupations and social circumstances.

(iii) Places and methods of education : when, where and under what circumstances educational opportunities should be guaranteed.

The forms of education can be classified into four types:

(i) Transmission of knowledge: through the transmission of information concerning facts and principles, to develop abilities to understand their meaning, to recognize rules or values in them and to use them for the purpose of self-fulfilment.

(ii) Training in techniques: to give a systematic understanding of processes and methods for the attainment of particular targets, and skills in making practical use of them.

(iii) Group-learning experiences: through various experiences of dynamic interactions of people, to develop abilities of self-control and of influencing others in the pursuit of self-fulfilment.

(iv) Educational counselling: to assist in transforming mental tension caused by frustrations in the pursuit of self-fulfilment into the will to seek new targets.

For the objectives of education it is necessary first to predict the given circumstances of the various social groups in future society on the basis of an analysis of present-day careers. Once this prediction has been made, there must follow an examination of the possible future objectives of education which would lessen the conflict between an individual's given circumstances and his subjective consciousness, thereby improving adaptation to his circumstances. This means that there are indeterminate factors which must be included in the formulation of the principles of organisation, and this poses great difficulties in defining in concrete form the future problems for education.

Once we have succeeded in visualizing the future objectives of education, we would be able to define places and methods fairly easily, as nothing more is needed than consideration of when and where particular objectives should be followed and what form of education should be applied.

It is difficult to visualize a comprehensive set of targets for the educational system of the future without having first examined in detail each of these factors. However, taking into account the teleological and methodological problems for education, it seems to me that the future educational system might be visualized as having the following characteristics:

(i) Compulsory education, in educational institutions, for a limited range of age-groups would take the form of individualized education in which the individual ability of each pupil would be guaranteed its full and free development. Educational technologies would be utilized to the fullest extent, and main emphasis would be placed on general education.

(ii) One of the most important functions of teachers in such institutions would be to encourage the development of social and independent personalities, mainly through the organisation of group studies and through educational counselling.

(iii) The acquisition of knowledge and skills required by adults for whatever reason would be possible at all times through the development of mass communication media. Technical training for occupations would become a public service function.

(iv) For adults, public institutions for counselling would be provided when needed to help them meet the demands of particular social situations.

II

LONG-RANGE PLANNING IN PERSPECTIVE

by

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I. INTRODUCTION

It is impossible to avoid looking far into the future in doing educational planning. Even short-range planning has long-range implications in education. The kindergarten class of 1970 will be the middle-aged population of the year 2000, and many of today's kindergarten children will still be active beyond the first quarter of the 21st century. Thus, a long-range plan for education will have consequences which will extend through the next 100 years or more.

Why, then, should one try to extend planning into the even more distant future? Is it possible to prepare the educational groundwork for future generations today? Lest one shy away from this task, it should be pointed out that it may be better to discern broad trends now, than be caught later by events which could have been anticipated through some investment in analysis and reflection at the present time.

In the socially activist environment which has permeated the educational scene in the United States, the objectives which an educational planner would set for himself appear to be clear-cut: they are the attainment of the equality of educational opportunity for all social classes. In other countries the objectives of long-range planning could conceivably be different. A planner may decide it is important to price out and develop a strategy for providing the education or training likely to be needed to satisfy a given mix of production at a certain level of technological sophistication; or he may wish to illustrate the extent to which present trends are likely to meet or diverge from some desirable level of social demand for education.

Each of these objectives is more easily stated than translated into the quantitative expressions required for an operational model which "grinds out" a long-range plan. For the most ambitious of these goals, that of achieving equality of educational opportunity, the problems are both methodological and conceptual. At what point is equality of educational opportunity achieved? Is it when children with similar school grades benefit from the same number of years of schooling, irrespective of social class? Or is equality of opportunity achieved when children of equal native ability attend school an equal number of years irrespective of social class? When should achievement or ability be measured - at birth? Age three? Age six? Or, as it is measured in a number of European countries, at eleven or thirteen?

In considering equality of educational opportunity, should one pay attention only to the years which a student spends in school, or should one also worry about methods of equalizing educational achievement for students who have completed a number of years of education? A long-range plan might also examine the trade-offs between extending education, in terms of years attended, while lowering average attainment standards, versus restricting the years of education while raising the attainment per year attended. Is it possible that society would be better off if more children learned more in a shorter time-span?

Since we now know very little about the relationship of inputs to outputs in education, much of the discussion of the effects of long-range plans must, of necessity, be hypothetical. Yet an orderly examination of the issues may focus on the research or institution building which may become necessary if these questions are to be answered with more certainty.

In order to get a long-range plan going, rather than falter due to indecision, it is essential to address at the very outset the broader underlying conditions which link education with the productive economy. Otherwise some of the fundamental objectives of the educational plan may be out of phase, and be offset by countervailing forces either in the economy or the educational system. As a minimum, one should examine the effects of technological change upon educational requirements, the effects of higher living standards and different social policies upon the demand for education, and the changes in the nation's social and organisational arrangements as they may affect the content of education itself. Finally, the long-range plan exercise ought to be a time when past trends are evaluated, and institutional constraints are taken into account to flesh out a practical blueprint for change in education.

Despite the uncertainties of budgetary appropriations, a long-range plan can provide a given thrust for the educational policy of a country, a region, or even a city. It would be a mistake to isolate the long-range planning exercise from short-range decision-making; however, the insights from the long-range plan must feed the developmental activities of the short-range plan.

II. THE IMPACT OF OVERALL TECHNOLOGICAL CHANGE UPON EDUCATIONAL REQUIREMENTS

Technological change has often been cited as the bogey-man which drives educational requirements for the labour force well ahead of the levels which are likely to be supplied by the educational system. Considerable research has been conducted in this area, but there have been few convincing findings that technological change is advanced or retarded by the presence or absence of highly educated manpower.

Even though we have considerable grounds to believe that technology a hundred years hence is likely to be considerably more complicated than it is today, there are few grounds for concern that, on the average, it will be more difficult to assimilate than the present technology is for today's labour force.

Some historical perspective about the adjustment of the labour force to technological developments may not be out of place. Before the turn of the century, for instance, the United States Census enumerated the few electricians in the United States as professionals. In the next 50 to 60 years, their status declined to that of craftsmen or skilled workers. In the 1926 Census in the USSR, chauffeurs were considered skilled workers. Since that time their status has come down to the same classification which is used in the United States, that of semi-skilled workers. During the past 15 years, we have witnessed a similar decline in the status of computer programmers, who began as professionals and are now generally classed as white-collar workers.

One reason for this change is that the general acceptance of a given technology usually results in the redefinition of the skills required to perform a given task. For example, electricians are no longer required to know how to maintain transformers, as well as wire a house. Chauffeurs simply drive cars, and are no longer expected to be skilled mechanics. Similarly, programming today consists mostly of coding, instead of involving complicated methods of addressing computers and familiarity with their intricate logic.

At the same time, general acceptance of a given technology usually brings a preacquisition of the skills needed to master it, resulting in shorter training periods. Youngsters who have been raised in cars, for instance, need much less driving instruction than their parents who were introduced to the automobile abruptly.

Hence, even given the great uncertainty about the exact characteristics of technology at the end of the 21st century, it is not likely that the problems of preparing workers then will differ considerably from those which were coped with successfully in the second half of the 20th century. This does not imply that present training requirements will prevail for present jobs, or that the new and more complex jobs may not require longer training periods. There may be important shifts in training or knowledge requirements, but it appears likely that these shifts will be accommodated within the envelope of existing stocks of knowledge.

If the United States' experience is any guide, the more difficult shifts which must be anticipated are in connection with technology's impact upon the demand for labour in the agricultural sector. As the rate of technological change has increased the productivity per worker - without a corresponding increase in the demand for agricultural commodities - there has occurred a mass involuntary migration from rural areas to the cities. Since educational standards and years of education in the rural areas are lower than the average for the city-born, the new migrants have had to seek entry jobs at the bottom of the skill ladder and have often failed in their attempts at upward mobility. This has produced a number of social strains in the system, which could have been avoided if a way had been found to upgrade the educational attainment of prospective migrants a number of years before their exodus.

It may be a good idea for a long-range planner to tie in his projection with some long-range prognostications about the demand for labour in sharply differentiated segments of the economy. If certain sectors are likely to lose their importance on the employment scene, and these are the sectors which are traditionally pockets of low levels of educational achievement, he may wish to direct his plans to forestalling the undesirable aspects of migration from area to area, or industry to industry, through appropriate educational programmes.

Even if a long-range blueprint for the economy does not exist, it may be desirable to make some simple-minded projections of demand for different types of labour by calculating the elasticities of demand in constant prices for certain sectors. After assuming a growth rate in gross national product, and a technological trend, quite useful approximations of long-range labour force requirements can be derived in this matter(1). In the long run, simple projections generally predict as well as sophisticated models.

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(1) If p is the latest period, and p-1 is the period before it (say, ten years), the demand for the output of a sector (S_1) may be represented as follows:

$$\frac{\dfrac{S_{1p}}{GNP_p} - \dfrac{S_{1p-1}}{GNP_{p-1}}}{GNP_p - GNP_{p-1}} = K$$

The future output may be calculated as

$$S_{1p} + K\ GNP = S_{1\ p+1}$$

The demand for labour,

$$\frac{S_{1\ p+1}}{P(1+t)^n}$$

where P is the productivity of labour in period p, t the base of technological change, and n the number of years elapsed.

III. THE DYNAMICS OF INCREASED LIVING STANDARDS AND SOCIAL POLICY

Two factors are conventionally mentioned in determining the social demand for education: the standard of living of the population, and the average educational attainment. A plausible argument has been made that as the standard of living rises and it becomes feasible for a larger proportion of the population to postpone its entry into the labour force, the social demand for education increases. However, even when incomes are kept constant, the social demand for education depends upon the educational attainment of parents. Parents generally aspire to higher levels of education than the one they have attained and their children are generally induced or motivated to seek them.

During the longer period covered by the long-range plan, it may be well to look at this relationship as a recursive one. As a very first approximation it may be useful to project the educational attainment likely to result not only from increased incomes, but also from the increase in educational attainment of the "new generations of parents". In the United States, the population has been divided into income quartiles or quintiles for such exercises, and fairly accurate projections of the demand for education have been produced.

Lately, these projections have tended to understate the actual school attendance in the United States, placing in the lap of the long-range planner the new challenge of estimating shifts in social demand which are likely to come about as a result of social policies put into effect by the government. In this country education has not been rationed. On the contrary, measures have been taken to encourage the participation of students in post-secondary education. Enrolments have been made easier by the establishment of open-door (no academic requirements besides high school graduation) colleges, and the extension of nearly $1.5 billion of financial aid to post-secondary students.

This infusion of resources and encouragement to attend post-secondary institutions has had the desired effect of increasing the proportion of all high-school students who have opted for college. While in the past 50 years or so roughly one-half of all high-school graduates attended some post-secondary institution some time after high-school graduation, current indications are that some six out of ten high-school graduates will be participating in the post-secondary system.

It is noteworthy that, given the modest level of stipends, the largest shifts in the propensity to attend higher education institutions has occurred among children whose parents are in the third income quartile. On the one hand, children of these parents could not rely on much family financial support while attending college; on the other, their parents are currently sufficiently well-to-do not to expect any contribution from their children to the family budget.

The increased possibility of enrolling in college appears to act as an incentive to poorer children to graduate from high school. Between 1960 and 1967, the dropout rate in the last year of high school decreased drastically for children whose parents were in the third income quartile. It is now no more than the dropout rate of children in the upper two quartiles. This decline in the dropout rate occurred concurrently with an increase in aspirations to attend college. It is noteworthy that the proportion of dropouts in this income group fell only after 50 per cent or more were planning to attend college. By contrast, the dropout rate of children in the lowest income quartile did not differ much in 1967 from what it was in 1960. Interestingly, this group's propensity to attend college has not yet reached 50 per cent.

Additional evidence indicates that this shift in the third income quartile was not the continuation of an overall trend towards fewer high-school dropouts. The dropout rate in the two highest income quartiles scarcely changed during the two time periods. The pull of college as an incentive to high-school graduation apparently had been exhausted there in a previous period. It appears that there is a strong peer group influence which serves to strengthen the intent to last out the high-school course. This peer influence appears to manifest itself once the propensity to attend college exceeds 50 per cent. We do not understand why this happens, and can only invoke the magic effect on consensus of a majority on a minority.

These developments have been discussed at length to draw some important morals for the compiler of the long-range plan. The most obvious is that the changes in educational policy which he advocates can affect his projections. Furthermore, it would appear that changes in educational demand are interrelated in a complex fashion. For instance, we have argued that incentives to attend post-secondary institutions may have influenced graduation rates from high school. Certainly, this effect was not anticipated when the legislation was enacted.

IV. THE "EDUCATION FOR WHAT?" ISSUE

Even if the long-range planner manages to sort out the social objectives of his plan, and to develop the requisite statistical model for his projections, he is still faced with the most crucial task of imagining a society a hundred years hence, so as to anticipate its demands upon the educational establishment.

For these exercises, there is a great deal of virtue in the use of hindsight. The perspective of the past one hundred years, a period during which the factory system remained the accepted method of production, indicates that the organisation of production does not change overnight. On the other hand, the increased emphasis on mass production, the specialization of labour and, lately, the greater importance of services in the national product, point to important shifts in the mode of operating the economy.

It is quite reasonable, though probably not too prudent, to assume that for the next one hundred years the organisation of society will remain pretty much as it is today. It is possible to visualize a society which is much more affluent, but not very different from the society we live in today. The majority of the working force will still devote the major part of their working lives to the production of conventional goods and services. Even though the proportion of goods production in the national economies of different countries may decline, these goods will still continue to be produced in a conventional manner, in conventional environments. Jobs in factories will still be differentiated and require little understanding of the overall process. The proportion of engineers may also remain fairly constant. Under these circumstances, the demands on the "knowledge industry" will increase only inasmuch as service jobs may require more formal training. The essence of this demand will remain the same. The ever-changing technology will require that the labour force possess general skills, and be flexible enough to adapt to new combinations of production processes. The new tasks will still be of a generally low level of complexity, although it is likely that they will be regulated and scheduled much more tightly. Current projections of the state of the art indicate that automation, and especially computer automation, is not likely to affect the content of most production jobs. It will enhance the productivity of labour through job-scheduling and quality control. In the field of management or supervisory activity, the threat of automation is even more remote. The tasks which require the exercise of judgment or human relations are not likely to be done by machine. On the other hand, they will probably require greater familiarity with quantitative analysis.

In the area of services, be they banking, education or hairdressing, it can be argued that there will not be any drastic changes in job roles either. In the past one hundred years we have consumed more of the same services without requiring service personnel to acquire drastically different skills. Since most service jobs do require an interface with the public, and many do have a professional aura, a shift from production to services may require higher average educational attainment from the labour force.

Were one to fall back on this cosy view of the future and consider it merely an extension of the past, one could conclude that the objectives of the educational system will remain the same. The challenge to the system would consist of doing better the things which it is doing now. Perhaps, if extrapolations of future work and living patterns indicate that an increasing share of the year is to be spent by the working population in leisure pursuits, some of the more ardent proponents of the uses of education would push to extend the scope of education to include leisure activities. It is not quite clear, though, whether any special training is required to watch television, or whether formal courses can be as effective as advice given across the fence by one's neighbour on such subjects as gardening - the most popular active leisure-time occupation for residents of the United States. In any case, it is suggested that the long-range education plans be concerned with essentials rather than frills.

This is particularly important if one wishes to think through the consequences for education of the advent of the post-industrial society, a spectre conjured by some social scientists to describe a state of events where personal self-fulfilment has supplanted Western societies' incessant drive for increased goods and services. In the post-industrial society only a small segment of the population will be occupied in productive endeavours, with the rest existing in a state of blissful search for self-fulfilment. Presumably these drones will be supported by State transfer payments to keep them at what would be called today a modest but adequate standard of living.

If this state of events were to come about, it is quite probable that the role of education would be greatly restricted. The introverted dropouts would no longer require the services of advanced education institutions. It is also quite likely that the "lotus-eating" segment of the idle would refuse to accept these services from any establishment source. If instruction is to be consumed by that segment of the population, it will be provided informally, outside of the channels which are usually included in a long-range plan.

Nor is it clear what role education could play in restraining those who are idled involuntarily. Presumably these would be the less able members of society, involuntary drones who could not be employed by sophisticated production processes. The post-industrial society could be made possible only by a very complex and highly productive technology which would require only few, highly-skilled persons to produce a plethora of goods.

Since the proponents of this future do not specify an unautomated service sector, it is not at all clear whether those with less ability will be able to find employment in that sector. It does not seem practical to lengthen their training to achieve the competence needed to manage complex processes. It is easier to imagine that a number of these potential workers could be placed in "sheltered workshops", just as the handicapped and the retarded are employed today through special arrangements, in order to escape the prospects of this Calvinist hell.

It is possible that some long-range planners may wish to orient their blueprint to meet these conditions. I, certainly, would not. The experience of so-called Socialist countries, such as the Soviet Union, does not present convincing evidence that human desires for the accumulation of earthly goods can be curbed. Nor have recent developments in technology given any succour to the proponents of the post-industrial society who claim that many less-educated and less-skilled workers cannot find employment in our society. In the United States, after the economy was brought out of a deflationary spiral, full employment conditions were reached. In Western Europe, large numbers of uneducated and unskilled workers are actively imported by West Germany, Holland, etc., countries with the most developed technologies.

In preparing the long-range plan, I would rather adopt an alternative description of social organisation, at least for the United States. Given the present trends in social striving of our society, it is quite easy to imagine a society which would shift its resources away from the production of goods and conventional services into an important, government-dominated sector of human services. A number of new institutions would be established to impart desirable "behaviour patterns" to the disadvantaged population. The justification for the establishment of these new institutions would come from the observed relative ineffectiveness of single, disparate "treatments" now being offered to remedy the social pathology of our society.

A consensus is already developing that packages of services, rather than individual services, should be made available to the poor. These would run the gamut from household management to education, medical services, job training and placement. Their objective would be to change the living styles of the poor so as to enable them to progress in society.

The introduction of these services may affect the training requirements for a segment of the labour force, giving birth to a wide range of new professions. The co-ordination of human engineering services may well require new, highly skilled professionals conversant with the techniques of a large number of social disciplines. At the lower end of the skill spectrum, it is quite possible that the cadres of subprofessionals employed in providing these services could also expand drastically. The child trainer, similar to the metapelet of an Israeli kibbutz, may become a fixture of the new society. Dietician aides may perform some comprehensive services to make adequate nutritional patterns acceptable to the poor, similar to the work of a practical nurse who implements a doctor's prescriptions. Such people do not exist in today's society but would have to be trained by institutions especially designed for this purpose.

The educational long-range planner may be called to make a contribution to the definition of the role of these new institutions. He may wish to detail the content of the new curricula, the organisation of training patterns, and the cost of reaching certain manpower levels to achieve predetermined social goals. It is mainly through the vehicle of the long-range plan that the practicability and the tuning of the intervention may be established. The short-term, even the five- or seven-year plan, is generally overburdened with details that are required to satisfy the budgetary process.

V. CHOOSING THE KEY ELEMENTS FOR INTERVENTION

Let us suppose you were put in the shoes of a long-range planner who had adopted as his social objective the equalization of educational opportunity, and also foresaw that the society's demand for goods and services would shift to a demand for integrated human services. How would you proceed?

I am afraid that before addressing these important and intellectually challenging problems you would have to start with a more conventional projection of the likely demand for education, its cost and the way it dovetails with the anticipated structure of the productive forces in society. If you were interested in providing modifications later so as to equalize educational opportunity and attainment by social class or group, you might disaggregate even your basic projection into segments showing what the attainment and achievement in terms of years of schooling might be, social group by social group.

This type of exercise often provides some interesting insights about where problems may arise in the next 20 to 50 years. For instance, if present trends continue in the United States, social class differences in aspirations to attend college are likely to be reduced sharply, if not eliminated by the end of the millenium, for children with equal test scores. By contrast, there is little indication that the gap in test scores, which are higher among children of the rich than among the poor, is being narrowed.

At least in the United States, it would appear that the short-range problem of equalizing educational opportunity at the post-secondary level will demand a large infusion of money for student support, but the real, long-range task of bringing about equality will require further equalizing of educational achievement early in life. We already have an inkling that transfer payments, such as scholarships and loans can increase the participation of the poor in post-secondary education. However, it is not at all clear what steps should be taken to improve their attainment.

The long-range plan may give educators an opportunity for estimating what resources might be available for this purpose and when, and to examine the best strategy for deploying these resources effectively. Suppose, for instance, that a combination of demographic factors reflecting the recent absolute decline in the birth rate, and a slowing down in the rate of growth of propensities to attend college, may cause a levelling, or possibly even an absolute decline in the need for funds to support students in post-secondary education. This may well be the case in the United States in the near future. It would be reasonable to assume that at that time additional funds would become available for a serious assault on inequality of attainment.

Since our arsenal of tools to improve attainment is quite bare, 20 years ahead is not too long a period to start planning a strategy for refurbishing it. I would prefer to regard the educational process as consisting of a series of inputs, each one inter-related, and each one subject to modification in order to produce the desired output. The inputs can be conveniently divided into human inputs, such as teachers, and capital inputs, such as curricula, teaching devices, classrooms, etc.

We have discovered that changing a single input in the production of knowledge, be it teachers, curriculum, or teaching devices generally does not produce large shifts in achievement. However, there are some theoretical indications that changing the total organisation of the classroom may produce dramatic differences. Personally, I have been impressed by the results of some thorough reorganisations of learning styles, such as the experiment of "learning for mastery" initiated by Professor Bloom of the University of Chicago in Puerto Rico.

The central factor in most conceivable reorganisations is the curriculum, if by curriculum is meant what and how things are to be taught. If the long-range planner wishes to attain a greater degree of educational achievement, I believe he may be forced to think about immediate ways of starting a new movement in curriculum development.

Today curriculum development is dominated by two groups of educators. The first group is interested in content, the second stresses methods of presentation. Both are worthy concerns. It is important to keep the textbooks up-to-date, given the rapid development of knowledge in most fields. It may be equally important to devise better ways of presenting the curriculum.

The most noteworthy attempts to affect the curriculum have blended both these trends. At the turn of the century, for instance, the progressive education movement developed a new curriculum by introducing into textbooks contemporary materials that were relevant to children. The presentation was also changed, so that the material could then be taught by the discussion method. Lately, a group of leading professors in the physical sciences, dissatisfied with the content and presentation of physical science courses, has been instrumental in developing new curricula, with more up-to-date coverage, using the "discovery method" as a vehicle for instruction.

Neither of these reforms brings one closer to the goal of equalizing educational achievement, however, since they are both oriented to the average or above-average child. Special curricula for slow learners do not generally emphasize new methods of learning, but take for granted the slower learning rate, and just skimp on coverage.

The need for new curricula which have greater power, and can be used to bring slow learners to a desirable level of performance has not been met by conventional curriculum developers. Even the unconventional curriculum developers have not quite faced up to this problem. The unconventional group consists of psychologists interested in proving theorems in learning theory. In order to advance their research, a number of them notably Glaser at Pittsburgh, and Suppes at Stanford, have been in the process of developing programmed instruction material.

Unfortunately, for the long-range planner interested in bettering the performance of the slow learner, these experiments were used to test the effects of new environments on learning, or to test the effect of machine reinforcement on the learning rate of male or female students. Scandinavian experiments in programmed instruction, notably those in Norway, have also been conducted in the same tradition. Most of the research is oriented to testing the effect of non-automated (pencil-and-paper) individually prescribed instruction on students' personality development and attitudes. The preliminary results of the Norwegian experiment were pronounced satisfactory, since students using programmed texts achieved as much, on the average, as students in conventional classrooms. The experiment was designed, it seemed, to show the possible economy in teaching manpower.

There has been no drive to develop specialized materials with increased effectiveness for slow learners in the current curriculum development scene. In the United States, while special readers have been developed for black children or the urban poor, their effectiveness is seldom tested. The method of presentation of these materials is conventional, and the increase in their effectiveness is supposed to occur because they improve the children's motivation to learn, rather than because of the material's intrinsic power.

If educational achievement is to be equalized, or an overwhelming majority of the school population is to achieve a certain predetermined standard, it may become necessary to reorient much of the curriculum research from the development of general curricula to that of special curricula possessing specified performance characteristics oriented to slow learners. Currently, it appears that the best chance to achieve this task is through the utilization of new and different technologies which promise to be more powerful than the conventional mix of oral and pencil-and-paper instruction.

In the United States, the so-called ES-70 project tried to develop a high school curriculum with the co-operation of a number of school districts. It bogged down without producing any outstanding results. This effort to produce a failure-proof curriculum of computer-assisted instruction never got off the ground, since the school districts involved spent an inordinate amount of time specifying the curriculum objectives and determining its content, then finally decided that their time would be more profitably spent exchanging information on model practices rather than reaching out for the more ambitious goal.

A drastic departure from existing practice in curriculum development is more likely to occur in a special institute designed for that purpose. As the experience of the United States Office of Education sponsored research in Educational Laboratories and Research and Development Centers has demonstrated, curriculum development in centres staffed with conventional educators is likely to follow conventional patterns.

If a special curriculum is needed, 20 years ahead may not be too soon to think about institution-building to promote it.

The whole issue of technology in education, a much narrower concern than the technology of the economy at large, is likely to pose some interesting challenges to those who wish to quantify the resources needed to achieve a given standard of educational attainment. To what extent are present training requirements for teachers sacrosanct? Could more teachers be trained with less investment? Should present teacher/student ratios be projected into the future in determining the need for educational manpower? How will the new curricula which need to be developed for the slow learners affect educational practices for all students?

Besides the structure of the curriculum, the long-range planner ought to examine the effect of innovations on training requirements. He ought not to be afraid to suggest that many functions in the school can be provided by persons with less training, even if this draws the ire of the educators. Such a suggestion goes against the United States' trend toward training teachers at the graduate level, as an increment to a liberal education. Nor should technological developments, especially individually prescribed instruction, be ignored in projecting the need for teachers.

For example, I fear that the introduction of automated or teacher-independent curricula in the United States will be much slower than is warranted by the promise of such curricula. Because of the fortuitous combination of a decline in the birth rate, an increase in college enrolments, and the return of large numbers of married women to teaching, we are more likely to have a surplus of teachers than a shortage. They will fight all systems which threaten their employment. Technological developments which economize on manpower will have tough political sledding.

It is quite likely that some technological developments will encounter a great deal of opposition from the educational establishment, which will try to protect jobs. On the other hand, given the tightness of educational budgets, capital-intensive technologies are not likely to be introduced unless they produce some corresponding savings in manpower.

The long-range plan ought to illustrate the consequences of a number of these strategies. For instance, it is highly instructive to contrast the costs of lowering class size by 20 per cent with those of providing half-day programmes for all children age three to six in the United States, and find out that they are equal.

Without going into the fancy legerdemain of conventional cost/benefit analysis, it is easy to deduce that the second alternative is likely to contribute more to the equality of educational achievement than the first one. If the long-range planner believes that there will be sufficient social pressures, and money, to employ all the teachers who are likely to be trained, it may then be best to plan a few years ahead to train and retrain teachers specifically for this new job. With the existing theories of cognitive development already providing good pointers about the content and direction of pre-school programmes, a major challenge is to modify the educational establishment so as to train professionals capable of organising programmes with cognitive content for small children. The long-range planner will then find it necessary to lay the groundwork for training new professions. Assuming a new profession of human development manager is to be invented, and that this manager must co-ordinate a number of broad-based activities aimed at changing the culture of poverty, for instance, the manner in which he is to be trained, the institutions to train him, etc., must be cranked up well in advance of the time mass training is likely to start.

A model for radical change in services to the poor is not likely to be developed through consultation. It is much more likely to come about as a distillation of successful experiences in real-life situations where the doing and the training are combined, preferably under the aegis of a university.

If my hunches are correct, most developed countries will have to develop new institutions in the next century to train people for a wide gamut of new professions. These institutions will offer short-term courses for sub-professionals working directly with the target population, longer courses for the managers of these sub-professionals, and high-level training for the managers of managers who will also be the planners of the total effort.

A long lead-time is required to "root" an institution in the educational system. Furthermore, since most institutions are likely to be staffed with members of the educational establishment, who share its values, they will take root only if they fit into a scheme which is acceptable to that establishment. On both sides of the Atlantic, difficulties have been experienced in attempting to introduce radical change in institutions without regard to the social context and goals of the educational community. By far the most dramatic example of the subversion of a planner's intentions is the story of the technical institutes in the United Kingdom. These institutes were established to train middle-level technical manpower for British industry. However, they are developing into fairly high-level university-type schools of engineering.

The subversion of the original idea was the result of circumstances and good intentions. The technical institutes were established at a time when the number of university places in the United Kingdom was growing much more slowly than the demand for post-secondary education. Hence the technical institutes could quite effectively skim off a highly able segment of students. It was only natural that the standards of the curriculum were then raised to accommodate the ability of the students. As the standards of instruction were raised, there was considerable pressure to upgrade the facilities. Hence, these institutions increasingly resemble the United States schools of engineering.

A number of lessons can be learned from this experience. First, the educational establishment will naturally cater to the more able students. Second, the curriculum and the staff will generally attempt to adapt to the ability of the students. And, most importantly, most institutions by their very nature attempt to upgrade themselves. Hence, in order to reach down to a less "attractive" type of student and include him in the educational system, the more able students must be taken care of first.

An illustration from the other side of the Atlantic will show that even after the more gifted students are taken care of, it is difficult to channel the services of an institution to a given social class of students. At best, one can target the institution to a group of given ability. This is the lesson which was learned from the pattern of enrolments in newly established junior colleges in the United States. Most of these institutions are "open-door" and require nothing more than a high school graduate certificate as a pre-condition for admission. Many were targeted to the children of poor families. However, since they are available to academically marginal students of all social classes, the majority of their students actually come from the upper half of the income distribution; the students enrol in college because it is the right thing to do. A sizeable minority are children of the poor, who are also poorly prepared academically, and attend these institutions to get a leg up in the occupational structure.

Some results of socially-oriented legislation in higher education in the United States in the mid-1960's further illustrate the width of the gulf between good intentions and reality. While these programmes were designed to attract children from poverty backgrounds into higher education, it is the children of parents right above the poverty line who benefited most. Only a small proportion of children whose parents were in the poverty group have sufficient academic preparation or sufficient motivation to opt for post-secondary education. Some of the children from poverty backgrounds have sufficient preparation, but do not share the values of those who believe in the importance of a liberal education. Traditionally, this latter group achieved some moderate success in life by entering apprenticeships in the skilled trades, or receiving on-the-job training for middle-level technical or white-collar positions. Attempts to steer them into an academic stream in the United States have not met with the expected success, nor brought the expected "gratitude" from that group. Especially among some Negro students who do not visualize a future for themselves in the white society, the general academic preparation without any "action" features has caused a great deal of disenchantment.

I believe that the demands for black studies programmes have been poorly formulated by the students, and their hidden agenda understood even more poorly by the administration of colleges and universities. For the majority of black students, the obvious road to social advancement in the community they know is through the control of and participation in the distribution of the large volume of social services which are channelled to Negroes. The demand for black studies could be interpreted as a reasonable attempt to understand the dynamics of the community - a step towards participation in the management of the community resources available to effect the desired change.

Planners who wish to produce institutional changes in higher education should remember George Bernard Shaw's paraphrase of the Golden Rule, "Do not do unto others as you would wish them to do unto you. They may have different tastes." They must take into account the wishes, or value structure, of the teaching profession, which is oriented toward the gifted rather than toward the slow learners. At the same time, they must know the characteristics of the potential students.

For instance, the establishment of new institutions to train the human development manager, mentioned above, will appear to the "action oriented" youths. Those with slight academic credentials will be trained for para-professional jobs, those with better preparation for the professional ones. However, the chances for establishing viable institutions of this sort will exist only after the academically oriented, as contrasted with the "action oriented" youths, have been taken care of.

VI. CONCLUSIONS AND SUMMARY

Making a long-range educational plan a viable instrument for social policy is a difficult but probably not impossible task.

I have argued in this paper that some factors which are purported to make this task impossible, such as the impact of technology on the content of education, should not be taken too seriously. By contrast, I have indicated that the successful planner can be his own worst enemy. If a number of his suggestions to ameliorate or democratize education are adopted, they may have unexpected results, and thus play havoc with his projections.

To get a long-range planning exercise off the ground it is essential to make explicit: (1) the objectives which the educational system is attempting to attain, and (2) the social organisation which will be served by the educational process. The long-range plan is the ordering of resources to orchestrate the knowledge industry for a given purpose under conditions which do not exist today.

If the analysis in this paper is realistic, the practices and organisation of most educational systems will require some drastic restructuring. The fleshing out of a long-range plan may give insights into the type of changes which may be required. These changes may need to be pilot-tested in the very immediate future.

It is precisely these insights which make the long-range planning exercise worthwhile. The planner's most difficult task is to look at likely developments in a manner unconventional enough to uncover areas where innovation is required, while keeping his imagination sufficiently in check as not to make the document appear too far-out to be taken seriously. A good check on the unbridled creativity of the long-range planner is his understanding of the objectives and the unspoken goals of educators. A realistic long-range plan will aim for a broadening of these goals and concerns, rather than the revolutionary liquidation of the present system.

III

THE FORECASTING OF PLAUSIBLE ALTERNATIVE FUTURE HISTORIES: METHODS, RESULTS, AND EDUCATIONAL POLICY IMPLICATIONS(1)

by

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I. INTRODUCTION

The purpose of this paper is to describe a newly developed and, in fact, still evolving approach to the derivation of comprehensive sets of alternative future histories, and to illustrate their application to educational policymaking and planning.

This is, in essence, a progress report on work being carried out at the Educational Policy Research Center, Stanford Research Institute. It describes the forecasting techniques being used, and presents some useful, although preliminary, results.

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(1) This paper is drawn from reports in draft at the Educational Policy Research Center, Stanford Research Institute, Menlo Park, California. The work reported here is the joint product of the staff of the Educational Policy Research Center and Johnson Research Associates, Santa Barbara, California, consulting to the EPRC.

The basic concept involved is that if a comprehensive set of alternative future histories for the nation can be constructed, they will serve to illuminate educational (and other) policies. Planning can only be done in a context. In the case of education where the inherent time lag between a decision to make a change and the major impact of that change may be of the order of decades, the context needs to involve long-term forecasting of alternative futures. In order that plans may be examined for suitability under different contingencies, it is most desirable that the set of plausible future histories be comprehensive - that is, that the probability be high that the actual future history, when it occurs, will be within the "region" defined by the constructed set. (These remarks may be made more intelligible by leafing ahead to Figures 12 and 13 for a preview of such a set.)

In the present chapter we will present a brief overview of the approach and the reasons for selecting it. It amounts to selecting appropriate external descriptors (economic, political, social) and internal descriptors (cultural values and beliefs) to describe the state of society, and projecting this description ahead in time to create a "future history" - and then doing this again and again until all alternatives have been described which are deemed feasible by criteria to be discussed.

Chapter II will explain the selection of the internal descriptors. Chapter III describes the selection of external descriptors and the way in which the projections were carried out. Tentative results are presented.

In Chapter IV these results are examined in some detail for educational policy implications. Of some 40 alternative future histories which emerge from the analysis, it turns out that about half reach the year 2000 with highly authoritarian forms of government and considerably reduced individual freedom as compared with the present. Only a very few manage to avoid some kind or another of extremely serious troubles between now and 2050. The consequent implications for policy, if education is to play a role in helping "choose" a desirable future, are somewhat unexpected, although reasonable with hindsight. If the projected histories are at all on the mark, the task ahead is great and time is short.

Overview of the Approach

Any method of deriving a set of plausibly attainable alternative futures must somehow perform the processes of description, alternation, and projection. The selection of suitable descriptors represents a crucial choice. The description needs to provide adequate richness, yet it should not be too complex to handle. It may include both qualitative patterns and more quantitative parameters. In order to insure against bias in favour of that which is more easily quantified, we chose to restrict the basic descriptions used to qualitatively described patterns only.

Alternation refers to the generation of different combinations of the basic descriptors - that is, to possible alternative states of society. This can be done, in general, by morphological, extrapolative, or normative means. Morphological alternation (the principal method used here) considers all possible combinations of a given set of descriptors. Extrapolative techniques examine different possible extrapolations of current trends. Normative alternation considers different societal states which would be produced by actualization of differing values or goals.

Projection involves multiple prediction of plausible alternative courses of societal evolution. In other words it is the selection, out of a vast number of conceivable sequences of the possible states which result from the alternation process, of a minute fraction which are considered to be relatively likely. The criteria used in this selection process are a critical aspect of any method of alternative futures generation.

In the research being reported here we have found it convenient to describe the processes through which we forecast alternative descriptions of society by means of a symbolic state function.

$$\psi = \psi \quad (\underline{Ex}, \underline{I}, \underline{p}, \underline{t})$$

where ψ is a qualitative description of society, a state variable. As with many other practitioners, we found it useful to distinguish between value-free and normative elements of description(1).

We have used descriptive and value-free elements as the organising framework for the generation of alternative futures, and normative or motivational elements to provide an interpretive framework. Thus, the elements of the above expression are,

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(1) "Normative" and descriptive or "exploratory" methods of forecasting are discussed at some length by Erich Jantsch in Technological Forecasting in Perspective, OECD, Paris, 1967.

Ex, denoting external, social and value-free descriptive variables associated with exploratory forecasting;

I, denoting normative and motivational variables primarily referred to internal needs, values and beliefs of the individual; variables associated with more normative methods;

p denoting the processes and programmes of policy which relate and create limits of plausibility to otherwise self-consistent alternative descriptions of the future through scenario writing. At the present stage of development of our methods p creates sufficient, but not necessary conditions for existence of given alternative future histories;

t denoting time, making the functional description of the state of society time specific.

The "external, social, and value-free" types of variables designated by the above Ex were operationalized by a technique termed Field Anomaly Relaxation (FAR), described in detail in a later section. Six "sectors" of description of the United States society were chosen to comprise a minimal descriptive framework for a first iteration of the method. These were:

E: United States Economics
I: United States Internal Politics
S: Science and Technology
D: United States Demographic Patterns
H: World Population/Subsistence ("Hunger")
F: United States Foreign Relations

For each of these we selected from four to six alternative factors of description covering the likely range of variation. Thus an "external" description of the state of society comprised, in its skeletal form, a choice of one pattern in each of six aspects. (Sparse though such a description may seem, morphological listing leads to well over 20,000 possible combinations.) Thus, in terms of the above functional expression defining the symbolic state of society, the external value-free descriptive elements are operationalised as $Ex = Ex(E, I, S, D, H, F)$.

The "normative and motivational" types of individual variables were operationalized by a somewhat different procedure. In an abstract version of stakeholder analysis, an heuristic typology was derived which designates modal "coalitions" of needs, values, and beliefs, each of which represents a major motivational syndrome from which social goals can be derived.

These coalitions, for convenience termed "NVB-sets", thus operationalized the (I) in the symbolic expression for the state of society. They were used to (1) flesh out and to give a normative and ideological "flavour" to the externally defined societal configurations; (2) create normative "force vectors" which can lead more to preferred lines of evolution in the "tree" of alternative future histories; and (3) provide the principal basis on which to evaluate the "goodness of fit" of various alternative futures to divergent stakeholder groups. Taken together these analyses form the basis on which to generate plausible scenarios and to form a bracketing "planning space" delimiting the future histories considered plausible.

Thus, the complete functional expression describing the symbolic state of society in operational form translates from

$$\phi = \phi\ (\underline{Ex}, \underline{I}, \underline{p}, \underline{t}) \quad \text{to} \quad \phi = \phi\left[\underline{E}, \underline{I}, \underline{S}, \underline{D}, \underline{H}, \underline{F}, (\underline{NVB}), \underline{p}, \underline{t}\right]$$

Three additional types of exploratory research supplemented the analysis of alternative futures:

(1) The kinds of futures were estimated that might result if each in turn of the derived NVB-sets were used as a basis on which to determine national policy. This analysis illuminated some important differences in policy terms of differences in needs, values and beliefs, as well as some unforeseen consequences of actualizing different values into public policy(1).

(2) The writings of Western utopian thinkers throughout history were analysed according to what premises they held regarding the nature of man. Implications regarding alternative conceptions of "good society" were drawn and related to the derived NVB typology(2).

(3) An analysis of revolutionary pressures currently existent in the United States were analysed and alternative resolutions compared. This analysis will be briefly summarized in a later section of this paper.

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(1) This work is presented in an EPRC working draft by Ely M. Brandes, "Needs-Values-Beliefs Alternative Futures", Stanford Research Institute, Menlo Park, California.

(2) This work is presented in EPRC Research Memorandum 6747-7 by Joan Lewis, "Utopias as Alternative Futures", Stanford Research Institute, Menlo Park, California.

A distinction is useful between plausible results and paradigmatic or exemplary ones. While plausible future histories are the raison d'être of the present exercise, various kinds of non-plausible societal descriptions are of heuristic usefulness, especially in the early stages of methodological exploration. Utopian thought demarks normative bench-marks with which to "map" the futures which are currently seen as plausible or feasible to strive for. Consideration of the NVB-based futures, on the other hand, not only is a convenient way to explore the vectors of future development implied by different sets of needs, values and beliefs; it also reveals some of the (often negative) unforeseen consequences of following a given "pure" set of preferences.

Methods which purport to satisfy the property of plausibility must satisfy a number of realistic constraints. If the alternative descriptions of future history are to be believable, they must satisfy the properties which we know "reality" to contain. Any society (in reality) is internally consistent in the sense that all of its aspects coexist simultaneously. It is furthermore sequentially consistent in the sense that all of its aspects "flow" from the past into the future, with no disjunction. (From an analytic standpoint catastrophic events are an important class of exceptions to this rule.) Satisfaction of these two properties are an important part of the reasons why iteration is a necessary feature of the method. The description of utopian societies, on the other hand, does not require sequential consistency, and the rapid (one generation) dissolution of the majority of utopian experiments suggests that lateral consistency may also have been lacking.

Methods productive of plausible alternative future histories must also model the constraining forces of cultural momentum and limited resources. As Arnold Toynbee noted, history records various resolutions to the tension between societal "necessity" and "opportunity". The opportunity for "willed change" leading to a desired complexion of society is more limited in the short range than in the long range. (The commonly observed "tree" or cone shape of attainable alternative futures reflects this property.)

A second distinction contrasts the swiftness or time-rate of changes which are allowed in the analysis. The work reported here assumes only incremental changes. Results of an analysis of contemporary revolutionary pressures indicate that this probably is a good assumption since no penetratingly successful revolution could be seen as plausible in the next few decades. Many of the future histories as described implicitly assume the rapid emergence of certain technological and social developments. However, it should be noted that future histories with marked discontinuous change (such as nuclear holocaust, catastrophic epidemic, "real" revolution followed by anarchy, or massive geological disturbance) are not included.

II DERIVING NVB SETS

(NEEDS-VALUES-BELIEFS GROUPS)

Different goals, needs, values, operating styles, etc., of both individuals and institutions strongly affect the course of history. As we look forward to the future with an eye to its purposive invention, we must needs face the question, whose ideal future should be invented? Thus we are obliged to consider systematically normative constructs, in order to (1) describe alternative futures in terms of their cultural and normative climate; (2) evaluate alternative futures in terms of the degree to which they offer potential fulfillment to the desires of divergent stakeholder groups (one way to assess the "quality of life" of a society); and hence (3) roughly forecast the relative plausibility of various lines of evolution of the alternative future histories whose derivation is discussed in the next chapter.

Of the numerous types of motivational and normative constructs available, we chose to focus on needs, values, and beliefs. One of the principal reasons for this choice was the fact that needs, values, and beliefs tend to underlie more superficial goals, attitudes, and related variables, hence they are more stable and of more universal applicability to diverse societal descriptions, some of which may differ markedly from the present in both specific characteristics and overall "flavour".

We use the term "need" to designate the crucial physical, mental, and emotional resources that people require to attain a desired quality of life. Needs specify the core area of a person's concerns without giving the fulfillment of those needs any direction or style. "Values" are seen as the direction-giving element. Values point to those goals - both instrumental and terminal - which satisfy various needs. Beliefs, on the other hand, specify what for each individual is real. Beliefs in the context of policy analysis thus have much to do with what is considered possible, what is valid, and how one's values interact with the real world.

For our purposes, however, these distinctions are less important than the fact that systems of needs, values, and beliefs held by both individuals and institutions tend to be relatively coherent, and to interact in such a way that changes in dominant needs are often associated with changes in values and beliefs as well, and vice versa(1). Differences between sets of need-value-belief (NVB) "syndromes" were thus used as the basic way in which normative considerations were made explicit.

"Stakeholder" Types

Of the many taxonomies available in the social-science literature, twenty classifications representing different socio-economic, political, and psychological orientations were chosen as organising rubrics from which to derive a new taxonomy representing clusters of related needs, values, and beliefs. The principal characteristic aimed for in the derived taxonomy was ability to evaluatively discriminate between broad policy issues which are of significance to education in the larger sense.

The socio-economic classifications used were the traditional lower class, lower-middle class, middle class, upper-middle class, and upper class. The political set consisted of groups whose dominant ideology is radical, liberal, moderate, conservative, and reactionary.

Two psychologically oriented taxonomies were used. The first was the hierarchy of needs of Abraham Maslow(2) which classifies the population according to their dominant need concern. Survival needs, security needs, belonging needs, esteem needs, and self-actualization needs make up this set. The second psychologically oriented set consisted of six of Clare Graves'(3) "levels of existence" - termed for convenience: aggressive, ordered existence, materialistic, belonging, personalistic and being-motivated.

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(1) Herbert Hyman, "Value Systems of Different Classes: A Socio-Psychological Contribution to the Analysis of Stratification", in S. Lipset and R. Bendix (eds.), Class Status and Power, Glencoe, Ill., Free Press, 1953, pp.488-499. Amitai Etzioni, "Basic Human Needs, Alienation and Inauthenticity", American Sociological Review, Dec. 1969, 33, No. 6, 870-885.

(2) Abraham H. Maslow, Toward a Psychology of Being, New York, Van Nostrand, 1962.

(3) Professor Graves' (of Union College, Schenectady, New York) work is best represented at present in a number of unpublished manuscripts. An easily obtained reference is "The Deterioration of Work Standards", Harvard Business Review, 44(5), 1966, 117-127.

The views of these twenty "stakeholder types" were simulated and then statistically analysed in order to synthesize a higher order set of NVB-groups. Figure 1 schematically depicts the relationship of the steps involved.

Selection of Specific Judgeable Items

The next step was to generate an appropriate list of policy items which would be judged for evaluative salience by the various classes of persons listed above. We wanted to develop sets of policy issues which are (1) reasonably comprehensive in the sense of describing the more important dimensions of society; (2) actionable on the part of individuals, groups, or institutions; (3) relevant to education in the larger sense of the word; (4) NVB-responsive in the sense of high discrimination; and (5) of high future discrimination power, in the sense that a given issue, if acted on would have high potency in determining the nature of the future which would result.

A systematic procedure for generating wide coverage of issue-content areas was desired. This had to accommodate many different kinds of abstract concepts and dimensions, and their interrelationships. Zwicky's "morphological analysis"(1) provided a convenient scheme for generating and organising the items. An array was chosen involving three taxonomic dimensions:

concerns,	the substance of policy issues irrespective of site of action; e.g., what kind of decision-making process is used and the ultimate source of authority it appeals to; benefits/goals/beliefs/values; people changing technologies and their development; population; pollution.
content,	the more or less structural site of action of a policy issue; e.g., education, industry, the family and other socializing institutions.
dimension,	the bases along which different possible policy choices (and alternate future policies) can be arrayed; e.g., central-peripheral; personal-mechanical; universalistic-pluralistic; public-private.

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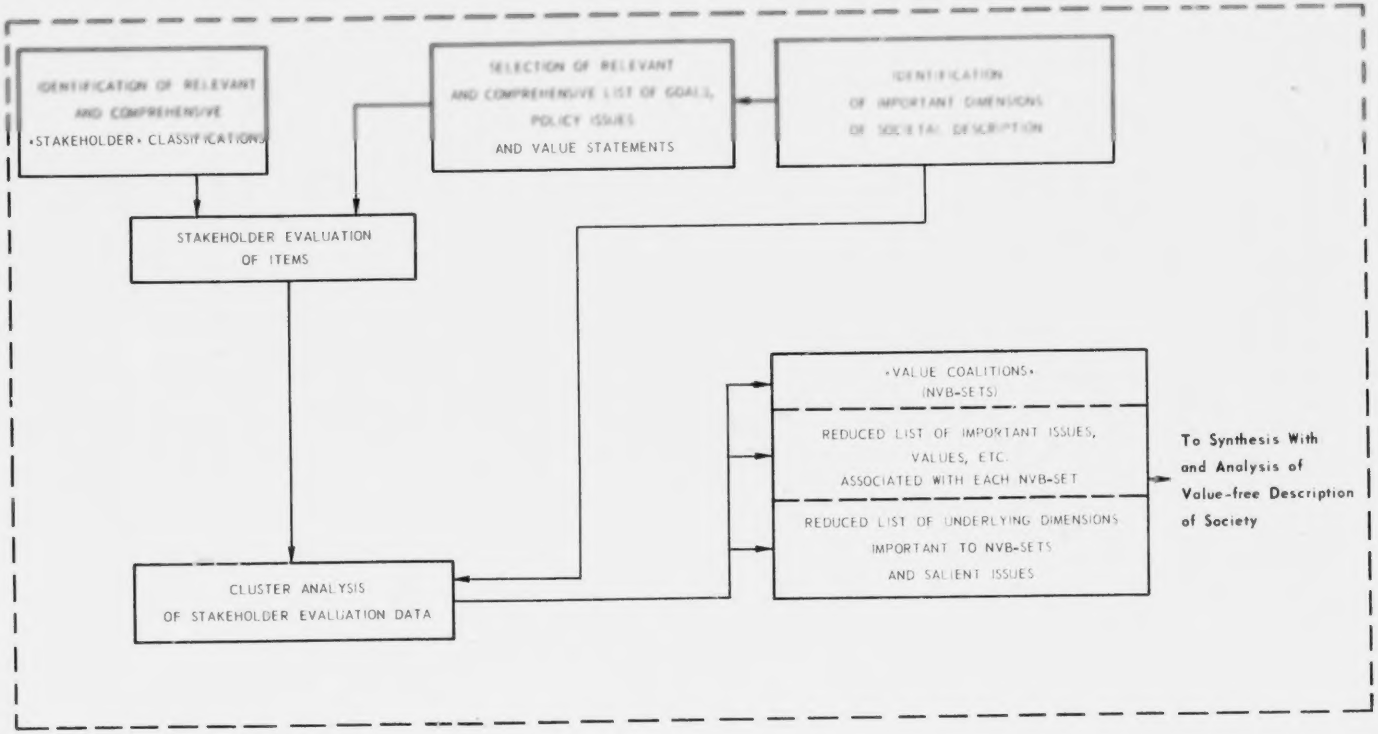
(1) This technique is described in E. Jantsch, *Technological Forecasting in Perspective*, OECD, Paris, 1967.

Figure 1

SCHEMATIC DIAGRAM OF STEPS IN NVB SET DERIVATION


IDENTIFICATION OF RELEVANT
AND COMPREHENSIVE
•STAKEHOLDER• CLASSIFICATIONS
SELECTION OF RELEVANT
AND COMPREHENSIVE LIST OF GOALS,
POLICY ISSUES
AND VALUE STATEMENTS
IDENTIFICATION
OF IMPORTANT DIMENSIONS
OF SOCIETAL DESCRIPTION
STAKEHOLDER EVALUATION
OF ITEMS
CLUSTER ANALYSIS
OF STAKEHOLDER EVALUATION DATA
•VALUE COALITIONS•
(NVB-SETS)
REDUCED LIST OF IMPORTANT ISSUES,
VALUES, ETC.
ASSOCIATED WITH EACH NVB-SET
REDUCED LIST OF UNDERLYING DIMENSIONS
IMPORTANT TO NVB-SETS
AND SALIENT ISSUES
To Synthesis With
and Analysis of
Value-free Description
of Society

These three dimensions provided as nearly orthogonal a cut as we could discover for ordering the quite diverse collection of constructs, variables, trends, etc., which had been initially put together from previous analyses and the various literatures of future studies, sociology, social psychology and political science.

The three taxonomies thus constructed may be conceptualised as a three-dimensional matrix, each cell of which forms a gestalt from which an item may be generated. In fact, many cells were found to be of low relevance, while other cells were used to generate more than one item. From the matrix of over 3000 cells a final total of about 300 items were generated. Finally the list was checked for adequacy of coverage of content areas of known policy relevance.

Judging and Clustering of Judgments

Judges were then each assigned several of the stakeholder types whose frames of reference they were to take. Assuming, in turn, each of these roles (based on thorough study of stakeholder-type descriptions) they evaluatively judged the complete set of items on a five-point scale. Through overlapping assignments each stakeholder type was represented by two different judges. Where they differed, additional type evaluations were made. Each judge additionally rated the items according to how he personally felt, and these ratings were used in a special analysis for validity and reliability.

These simulated stakeholder evaluation data were then subjected to routine statistical factor analysis but with "stakeholder types" being treated as variables and evaluations of policy items for each group as replications. Orthogonal rotation of principal-axis factor structure yielded two kinds of data which were useful. (1) It generated a four-group taxonomy of NVB-type clusters based on the data from all the input "stakeholder types". Table 1 lists the specific types whose policy evaluations were most highly correlated with the four clusters thus derived. (2) It generated scaled "votes" (i.e., factor scores) for each of the "NVB-types" on each of the original policy items. These data, examples of which are given in Table 2, thus became part of the operational definition of the NVB-types.

The composition of the clusters (Table 1), the salient policy issues for each (illustrated in Table 2), and the underlying dimensions to the salient policy issues, were used to flesh out paradigmatic descriptions of each of the four types which are summarized in Figures 2, 3, 4, and 5. These descriptions provide an explicit basis for inferring the response of NVB-types to the various alternative future histories whose derivation is described in the next chapter, and also for assessing the "goodness of fit" of various alternative futures to each of the NVB types.

It should be emphasized that the value and validity of these NVB typings lie primarily in their utility to the types of analysis being considered here. No claim is implied that they serve the more ontological purposes assumed by traditional social science(1).

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(1) This point is explicated in detail by Crow and Noel's "The Valid Use of Simulation Results" (La Jolla, California, Western Behavioral Sciences Institute, 1965) which is reproduced in part in Raser, J.R., Simulation and Society: An Exploration of Scientific Gaming, Allyn & Bacon, Boston, 1969, p. 141.

Table 1 - "STAKEHOLDER TYPES" CORRELATING MOST HIGHLY WITH NVB-TYPE CLUSTERS

Cluster defining NVB-Type No. 1: "Materialistic"	Socio-economic level	: Upper-Upper
	Political	: Conservative, Moderate
	Maslow	: Esteem
	Graves	: Materialist
Cluster defining NVB-Type No. 2: "Person-centred"	Socio-economic level	: None
	Political	: Liberal, Radical
	Maslow	: Self-actualizing
	Graves	: Personalistic, Being-motivated
Cluster defining NVB-Type No. 3: "Status-quo oriented"	Socio-economic level	: Middle
	Political	: Moderate, Conservative, Reactionary
	Maslow	: Belonging
	Graves	: Belonging, Ordered Existence
Cluster defining NVB-Type No. 4: "Poor"	Socio-economic level	: Middle and Lower
	Political	: None
	Maslow	: Survival and Security
	Graves	: None

Table 2 - NVB-TYPE "VOTES" ON EXEMPLARY ISSUES(1)

Issues Stated in Condensed Form	Materialistic	Person-centred	Status quo	"Poor"
	Type Number			
	1	2	3	4
UN should be run, 1 man, 1 vote, not 1 country, 1 vote	-1.82	-0.83	-0.04	-0.47
Air pollution laws should be strict enough to reduce pollution to 1940 levels	-2.09	.17	.91	-0.37
Level of taxation should be greatly reduced to encourage development of private venture capital	2.14	-0.06	-0.23	-1.18
Society is better off if people are concerned with immediate practical things than with universal value issues	2.08	-1.44	.83	1.07
To excel an individual must stand alone	2.52	-0.63	-2.33	-0.18
Individual initiative not government action is most effective in solving social problems	2.25	.61	-0.67	-0.41
Capitalism is most economic productive system invented by man	2.02	-0.73	.26	.73
Police action should be oriented toward maintaining order rather than enforcing laws, rights of individual	-0.50	-1.99	.87	-0.56
Technical advances can solve most of the serious problems of the human race	.75	-1.79	-0.52	.22
Education should train individuals to deal with specific, practical problems rather than broad understanding of arts, letters and sciences	1.34	-1.94	-0.05	1.71
We should not trust intuitive knowledge unless conclusions can be empirically confirmed	.53	-1.81	1.01	0
United States should never give up sovereignty to supranational world institution	1.18	-1.94	.19	.51
Public policy should be based on assumption that most people cannot be trusted very far	1.20	-1.89	.15	1.22
A child should be taught to place the needs of society above his own	-0.23	-1.37	1.74	-0.81
Although one can work legally to change laws, one should always obey laws on the books at the time	.49	-0.55	1.75	-1.31
The basic organisation of our society should be fundamentally changed	-1.59	.14	-2.14	.29
Legal training should be part of high school curriculum so all people can defend themselves	.32	.19	.15	1.97
Health care should be reorganised to assure even distribution of personnel and facilities in population	.18	1.16	.30	2.01
We should establish guaranteed annual income for all citizens	-0.98	.56	.16	1.73
Unions should think of national effect of their actions rather than interests of members	.82	.04	.56	-2.17

(1) The "votes" are constructed to be normally distributed in each group with a mean of zero and a variance of unity.

Figure 2 - PARADIGMATIC DESCRIPTION OF THE "MATERIALISTIC" NVB TYPE

The principal need is for the esteem of others. Avenues of fulfillment in the Western World of today include materialistic acquisition, status, fame, wealth, control and conspicuous consumption, although often altruistic avenues are pursued as well. Strong values include independence, freedom, sense of accomplishment, social recognition, and national security and "challenges".

The preferred form of government is capitalistic, tending toward laissez-faire. The preferred type of educational system is technologically progressive, but highly structured - emphasising individualized instruction for the gifted.

Dominant beliefs relate to visible, measurable "external" factors. Knowledge is most usefully acquired through the physical senses; ultimate explanations are in terms of quantitative relationships among elementary events. Motivations typically are extrinsic.

Figure 3 - PARADIGMATIC DESCRIPTION OF THE "PERSON-CENTRED" NVB TYPE

The principal need is to live up to one's inwardly felt potential. Thus the unfolding of the individual, of living so as to fulfill one's ideals of what is meaningful is the goal of life. Avenues of fulfillment in the Western World of today include a wide range of activities, but often centre on the "helping" professions, aesthetic pursuits, and philosophic inquiry - both intellectual and intuitive. Strong values include freedom, inner harmony, wisdom, a world at peace, and "mature love".

The preferred form of government is pluralistic in nature, whatever the "external" structural properties or labels it may have, but tending toward participatory democracy. The preferred form of educational system is open and pluralistic, with divergent institutions and processes to meet varied human need-concerns.

Dominant beliefs related to the "meaning" of human existence. Knowledge is thought to be usefully acquired by looking within as well as without; ultimate explanations are to be found in the processes of human conceptualisation; man's fundamental motivation is his drive toward inner growth.

Figure 4 - PARADIGMATIC DESCRIPTION OF THE "STATUS-QUO" NVB TYPE

The principal need is to preserve the position to which one has attained. Tradition-oriented, the status-quo oriented seek to insure stability by maintenance on rigid structures, preservation of that which "works". Avenues of fulfillment in the Western World of today include the whole range of possible classifications, but focus in tradition-directed roles - both professional and personal. Strong values include a comfortable life, security, friendship of peers, and "happiness".

The preferred form of government is whatever is in power (as long as dominant social classes and processes are sufficiently stabilised). The preferred form of educational system is basically conservative, passing on the ideals of the past and socializing youth to accept the skills, institutions, and the norms of the present.

Dominant beliefs relate to concepts and processes legitimated by established institutions to which they belong. Knowledge is seen in terms of what was required for them to get to where they are - other types often being viewed with suspicion or dismissal. Ultimate explanations are in terms of traditional or institutional definitions. Motivations typically are conservative in nature.

Figure 5 - PARADIGMATIC DESCRIPTION OF THE "POOR" NVB TYPE

Core needs of this group revolve around survival and security. Life resembles a perpetual, unresolvable clash between the individual and society. Thus the goal of life is either to eke out subsistence (psychologically as well as physically) or (in the case where the subsistence level has risen sufficiently to create radically rising expectations) to force society into a position where it must (for moral or other reasons) equalize the distribution of goods and services in a more equal manner. Strong values include a comfortable life and equality.

The preferred form of government is socialist, emphasizing protectionism. The preferred educational system emphasizes effective teaching of relevant cognitive skills which will facilitate obtaining satisfactory employment and access to the mainstream of society.

Dominant ideologies are varied. Knowledge is seen as what the rich use to keep the poor down. Ultimate explanations sometimes seen as irrelevant.

III. ALTERNATIVE FUTURES FOR THE UNITED STATES 1970-2000

The method used to construct alternative future histories derives from an approach originated by Johnson Research Associates(1), in the course of several years' research into alternative world futures. In underlying philosophy the procedure is similar to the powerful relaxation methods of mathematical physics. Its ultimate power lies in the possibility of continued refinement, through systematic iterations, of a field of feasible future histories, considered as a whole.

The antecedent work involved a historical base study which culminated in a number of plausible, skeletal patterns among key variables on the international scene - conditions within the United States, the U.S.S.R., Europe, China, etc. Such primary patterns were then fleshed out, and further tested for chronological plausibility by constructing scenarios leading from the present to each projection, remaining mindful of trends and inertias evidenced since 1945.

Projection of comparable future situations within the United States required that the method be adjusted and extended, since so many different elements within the internal situation seem comparably important. That is, the meld of political and economic (and other) factors does not provide an obvious set of evidently dominant factors comparable to the great powers and major regions which had served handily in the earlier international projections. This difficulty was overcome through development of an intermediate set of factors, lying between a large number of individual descriptors on the one hand and alternate future patterns on the other.

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(1) This adaptation of the earlier work on "Projected World Patterns" is described in Johnson Research Associates' RM 69-3, Contingent United States Patterns, 1970 to 2000, Santa Barbara, California, November 1969.

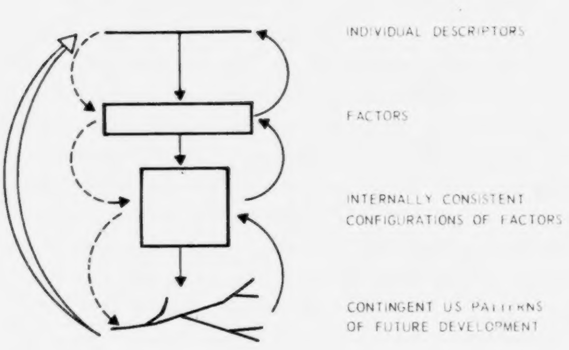
Preliminary Stages of Analysis Leading to a "Tree" of Alternative Futures

Perhaps the most important single characteristic of the procedure to be described is that it permits multiple iterations and a steady intervention of common sense. The overall approach is shown schematically in Figure 1. There are four discernibly different layers of analysis: (1) selection of a large number of descriptors, in this case about a hundred; (2) development of factors which combine such descriptors into a few distinctive sets, of which 33 were found potentially useful here; (3) development of a modest number (about 40) combinations of such factors into skeletal configurations of internally consistent future patterns; and (4) use of such snap-shots of the future in laying out a "tree" of plausible lines of future development.

As indicated by the loops on the diagram, initial designations at each level must be made with an eye to subsequent uses at the next (the dotted lines). Having arrived at a preliminary set at, for instance, the factor level, it becomes possible to develop the alternative configurations at the next level, but almost at once it proves necessary to loop back into the factor level in an iteration step. The configurations themselves are only an intermediate step in the chain; they too must be picked with an eye ahead to the description and analysis of contingent lines of future development. Then, as suggested by the longer arrow, it is necessary to cycle back to refine the original work in view of the explicit findings and implicit understandings gained during the early, more exploratory analysis.

The process has been effectively compared by Kurt Lewin (in a description applied to his own methodological explorations but equally applicable to any field-theoretic exploration) to the design of a road net for an area that can only be surveyed from roads already built. As he points out, the wise designer (or analyst) in such a situation starts with trails leading among the main landmarks and vantage points, keeping in mind from the start the character of the eventual system of super-highways that is to be built but relocating his trails and revising his preconvictions as enroute results permit an improved understanding of the whole.

Figure 6
ITERATION DIAGRAM


INDIVIDUAL DESCRIPTORS
FACTORS
INTERNALLY CONSISTENT CONFIGURATIONS OF FACTORS
CONTINGENT US PATTERNS OF FUTURE DEVELOPMENT

Nothing magical is being offered or claimed here. The method does indeed make it relatively easy to order the contributions from members of a research group and to profit from informed criticism, but the analysis depends more at every stage upon practical good sense than upon esoteric analytic techniques. Inputs from "hard" scientists, operations analysts, and behavioural scientists all may be incorporated, but the fundamental approach is one of ordering component analyses and estimates within a qualitative model, exposing sections of such analysis to critical inspection, and synthesizing the results.

Brief descriptions of the main stages of analysis follow.

1. Descriptors

Initial efforts to lay out sufficient rosters of items descriptive of such separate sectors of any United States pattern as foreign relations, internal political structures, technology, etc. showed almost at once that several hundred comparably significant descriptions would be needed, a number far too large to be dealt with effectively. These relatively minute descriptors clearly had to be condensed into a much shorter list of more inclusive descriptions.

2. Factors

Therefore a kind of qualitative factor analysis was undertaken, leading to the designation of four to seven alternative patterns or "factors" within each of six(1) main sectors of United States life. Each factor combines a number of descriptors. Several heuristic devices were used at this stage, including square interaction matrices(2) for each of the sectors considered, in which the plausible association of every pair of individual descriptors of each sector was considered. Such exercises do not lead by any direct line of derivation to the designation of more inclusive factors, but they are invaluable in acquainting each analyst with the subject matter before him and in helping to focus group discussions on particular small areas within the broader field of analysis. By such methods, reasonable degrees of individual familiarity with each sector was attained and sets of factors designated for each. The sectors treated were: Foreign Relations of the United States; conditions of Population and Subsistence in the developing nations of the world (included because of its probable interaction with internal United States politics); United States Demography; United States Internal Politics; United States Economics; and United States Technology.

It had initially been intended that another sector, namely that of socio-cultural characteristics, should be included, but tentative efforts to do so were unsatisfactory. The reasons for such failure were not immediately clear, but it seemed probable that it was due to the normative elements that must enter into any such description. An effort was made throughout this first iteration to keep the process descriptive and structural, and to leave normative considerations until a later stage in the analysis. Treatment of social groupings and such elements as enculturation and acculturation seemed to conflict with that resolve. Thus the decision was made to treat cultural factors as a kind of overlay on the future histories derived from the six sectors chosen.

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(1) The number of sectors and alternative patterns was selected merely out of a sense of what was comfortable, but it has since been pointed out that the number is approximately equal to the number of "chunks" of information that most people can hold easily in mind.

(2) Such matrices offer the kind of pair by pair comparisons that might tempt an analyst into efforts to derive statistically orthogonal factors. That course was avoided here for two reasons. First, the significance of nominally similar evaluations (such as "Yes Yes, these two factors really go together") vary widely and in poorly understood ways across any such matrix, and for this and other reasons a numerical treatment would imply a greater precision than exists. Second, the use of composed factors of the sort flowing from statistical manipulations cuts into the richness of the communications. Since common sense iteration is of the essence in the method being explored here, it is important that access to such relatively subtle kinds of discrimination and assessment not be interdicted. The qualitative treatment of easily recognizable factors seemed to avoid such interdiction better than did our few exploratory ventures at rigorous factor analysis.

For each of the six sectors listed above, a matrix was developed showing how each selected factor was composed of the individual descriptors for that sector. Figure 7 is presented as an example(1) here, showing the factors selected for the "Internal Politics" sector of the American scene. This example illustrates a number of the more important powers and weaknesses of this stage of the analysis.

Subjective selection and rejection are essential in picking and rechecking the selection of the factors. There is, for instance, the problem of how fanciful one should allow himself to become. The rule followed here has been to reject the very "far out" options (as, for instance, the technically feasible idea of having instant plebiscites using computers and substituting sampling techniques for representative democracy) while keeping at least at this stage those cases that only seem peculiar (such as extensions of current impulses toward direct democracy in a variety of less spectacular ways). An effort was made in the designation of factors to introduce ones that could serve to describe the better known projections in futuristic literature. Orwell's "1984", for instance, must be represented somehow in the final roster of alternative futures; thus factors to describe it and its origins must be "planted" during this stage of analysis.

There are two important reasons why such subjective processes should not be expected merely to reproduce the prejudices that the researcher brings with him to his work. Logical analysis can

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(1) The individual factors are listed horizontally at the top, while the separate descriptors are shown vertically. A check mark (✓) opposite a descriptor indicates that it applies to the factor in question, and where such a check mark is circled it means that that descriptor is an almost essential part of the factor. A cross (X) reflects a belief that that descriptor hardly could be an element of the factor in question. Blanks, of course, are noncommittal.

Figure 7

FACTORS IN INTERNAL POLITICS SECTOR

			FACTORS					
	DESCRIPTORS		STATUS QUO	INCREASED FEDERAL POWER	POWER LOCUS STATE/LOCAL LEVELS	SINGLE PARTY	DIRECT DEMOCRACY, MULTI-PARTY	CYBERNETIC BUREAUCRACY
			I_1	I_2	I_3	I_4	I_5	I_6
1	DEGREE OF DEMOCRACY	↑						
2		→	✓	✓	✓		✓	
3		↓				(✓)		✓
4	DIRECTNESS OF DEMOCRACY	↑			✓		(✓)	
5		→	✓	✓		✓		✓
6		↓						
7	AMOUNT OF GOVERNMENT	↑		(✓)		(✓)		(✓)
8		→	✓				✓	
9		↓						
10	CENTRALIZATION	↑		(✓)		(✓)	✓	(✓)
11		→	✓					
12		↓			(✓)			
13	SOCIAL ENGINEERING	↑		(✓)			✓	✓
14		→	✓			✓		
15		↓			✓			
16	IMPULSE TOWARD CHANGE	↑		✓			✓	(✓)
17		→	✓			✓		
18		↓			(✓)			
19	IDEOLOGICAL POWER	↑				(✓)	(✓)	
20		→	✓	✓				
21		↓			✓			✓
22	PARTY PROLIF. n > 3						(✓)	
23	n = 2,3		✓	✓	✓			✓
24	n = 1					(✓)		
25	SOCIAL JUSTICE	↑		✓	M			
26		→	✓			✓	✓	✓
27		↓			M			
28	POLITICIZED CRIME	↑					(✓)	
29		→	✓	✓	✓	✓		
30		↓						✓
31	EMPHASIS ON LAW ENFORC.	↑			✓	✓		(✓)
32		→	✓	✓			✓	
33		↓						

produce unanticipated results just as can numerical analysis. One who seriously and responsibly uses the heuristic matrices described earlier, and searches for distinctive and relevant factors, will be surprised time and again into rejecting some of his initial impressions and forming others. Also, such matrices provide an especially effective strainer of individual quirks when, as in the present case, the working group contains members of widely varied political and social persuasions. At the same time, however, it will be recognized that such lists of factors cannot be considered closed. Our results with this first set of factors already have shown that some factors may have to be added, and others modified or withdrawn, in the next iteration. The risks of subjectivity are reduced in this method by repeated iteration - a process of successive relaxation of anomalies within a field that is treated at all times as a complex whole.

These characteristics of the method will, unless one has an exaggerated view of the powers of explicit, rigorous analytic techniques, be recognized as appropriate to the nature of the problem attacked. The process of iteration toward successively refined but forever imprecise answers describes the basic empiricist concept of scientific method, while the idea of accepting the relevance of the whole even while its parts are being analysed matches all of the main findings of psychology and the behavioural sciences, systems analysis, and common human experience.

Another problem is exposed in Figure 7, namely the concurrent usefulness and danger of using short-hand labels for the factors. One needs some kind of "handle" by which to identify each factor both during analysis and subsequently in the presentation of results. However, each factor is truly complex, and there is a risk that the nicknames given the factors may be treated as though they were the kind of definitions that permit strict deduction of other attributes. Even analysts who understand the limitations of these abbreviations find themselves acting as though the names assigned to factors were definitive. In fact, even the pattern of check marks displayed for each factor on the factor analysis matrix is only a highly schematic set of hints as to the factor itself.

Following tentative settling on the relations among factors and descriptors for each sector of the whole field, narrative descriptions (about a page long) were prepared for each factor. As indicated in the example presented as Figure 7, each seeks to elaborate on the sort of relationships that cannot readily be displayed in matrix form. These help to reduce the likelihood that a given factor is interpreted very differently by different analysts and, later, by potential users of the results.

3. Internally Consistent Configurations of Factors

With a list of tentatively described factors in hand (see Figure 9), the next steps of analysis became possible. A large, square matrix was formed using all of the 33 factors, and each square of that matrix, (i.e., each pair of factors) was scored as to the degree of "fit" of the two factors in question. If it were easy to visualize a condition in which a given pair of factors might co-exist, the letter, Y, was entered in that square. If the pair were very strongly associated, so that one would expect to find the second in any world containing the first, a double yes, YY, was entered. If the existence of the pair seemed generally counterindicated, the letter, N, was entered, and if the two seemed mutually incompatible, the entry was, NN.

The square factor matrix was filled out in preliminary form without explicit reference to the NVB clusters. A given score (the letter, Y, for instance) might mean different things on different points on the display. Factor A might be judged to be compatible with factor B (with one embracing context in mind) and with factor C (within some other context); the factors A, B, and C therefore might or might not all be plausible members of some one overall pattern. A collection of all of the combinations of factors in which only affirmative or neutral assessments were represented should, however, contain all of the internally consistent sets.

Figure 8 illustrates this stage of analysis, consisting of a blow-up of one portion of the broader matrix. In this illustration, factors descriptive of the two sectors, Economics and Internal Politics, are played against each other. Considering only the top line of that sub-matrix, it will be noted that factors I_1 and I_2 were assessed as being positively associated with E_1. The pairs, E_1 I_3 and E_1 I_5 were labelled, "M" for "maybe", and the remaining two pairs were assessed to be counter-indicated. In words, and working just with factor nicknames rather than full descriptions, for example, the uncertainty concerning the pair E_3 I_1 suggests that the United States might conceivably be subjected to another major depression without serious modifications of its internal political structure, but sweeping political changes also would be plausible.

Figure 8 - A SAMPLE FACTOR FROM THE INTERNAL POLITICS SECTOR: I_4, SINGLE-PARTY GOVERNMENT

Such a pattern of government in the United States almost certainly would be associated with increased centralization and with increased penetration of government into each citizen's life. The degree of democracy would drop sharply, but that which remained might be relatively direct and there probably would be intensified emphasis on law enforcement whether the ruling clique were of the left or right. Ideological fervour would tend to be high.

Explicit dictatorship, with its effective abolition of elections would be one possible condition here and would be especially probable if the pattern were to persist long enough to undergo much internal evolution. The pattern might well start as a sort of Caesarism, however, with the electorate voting itself into the hands of a tyrant (in the relatively non-invidious usage of ancient Greece) in order to allow the government to try to cope with pressing problems without being burdened at each step by a carping opposition. Under such a condition, election might be continued, with voter selection limited to those candidates approved by the government. Politicized crime might remain at moderate levels, but a more likely result in a country as accustomed as this one to actual choices would be one in which goon squads in the service of "Caesar" would try to seek out and quiet potential dissidents before their protests might surface in embarrassing ways.

Figure 9 - FACTOR ROSTER

United States Economics

E_1: Prosperous, expanding-free enterprise
E_2: Slow growth, stagnant-free enterprise
E_3: Depression - start under free enterprise
E_4: Prosperous, expanding - strong government control
E_5: Unsuccessful government control
E_6: A non-expanding, successful economy
E_7: Communalism

United States Internal Politics

I_1: Status quo
I_2: Increased federal power
I_3: Shift of power locus to state/local
I_4: Single-party government
I_5: Direct democracy, multi-party
I_6: Cybernetic bureaucracy

Science & Technology

S_1: Rapidly expanding technology
S_2: Stasis; elite security
S_3: Stasis; little advance, much application
S_4: Active science; shift to behavioural science
S_5: Active science/technology; anti-pollution forces

United States Demographic Patterns

D_1: Status quo, 300 million by 2000
D_2: Extreme urbanization
D_3: Population dispersion, pastoral
D_4: Like D_1, but technological and connective

World Population/Subsistence

H_1: Optimistic, "Green Revolution" a success
H_2: Like H_1, but technical failure of G. R.
H_3: Like H , but G. R. negated by violence
H_4: Reductions in help to developing nations
H_5: Population stabilization without G. R. success

United States Foreign Relations

F_1: Status quo
F_2: Only AID involvement in underdeveloped world
F_3: Selective AID/Military involvement in underdeveloped world
F_4: Isolation re underdeveloped world; involvement with developed nations
F_5: General isolationism
F_6: "Manifest Destiny"

Figure 10 - AN ILLUSTRATIVE PORTION OF THE FACTOR MATRIX - THE ECONOMICS VS INTERNAL POLITICS SUB-MATRIX

Internal Politics / Economics	I_1: Status quo	I_2: Increased federal power	I_3: State/local power	I_4: Single party government	I_5: Direct democracy, multi-party	I_6: Cybernetic bureaucracy
E_1: Free enterprise prosperity	Y	Y	M	N	M	N
E_2: Slow growth, stagnant - free enterprise	M	Y	Y	N	M	M
E_3: Depression, free enterprise	M	Y	N	M	N	M
E_4: Prosperous, expanding - government control	NN	Y	Y	M	N	M
E_5: Unsuccessful government control	NN	NN	NN	Y	N	M
E_6: Non-expanding, successful economy	Y	N	Y	M	N	M
E_7: Economic communalism	N	NN	Y	N	Y	M

The next step was to collect six-letter sets such that no "N" or "NN" entries were present. For example, the set $(E_1I_1S_1D_1H_1F_1)$ has a "Y" or "YY" in each of the relevant squares on the matrix. It is not sufficient, however, merely to look at one line of the full matrix when selecting the sets that go together. For instance, the matrix shows Y assessments for E_1I_1, E_1S_3, and E_1F_6; this would suggest that $E_1I_1S_3F_6$ might be members of one internally consistent pattern. However, that conclusion is ruled out by an "N" assessment for the pair S_3F_6. Pursuit of this process yielded about 300 nominally self-consistent configurations out of the total of over 20,000.

Nearly three-fourths of the sets in this list of 300 were descarded on the ground that while individual pairs of factors might fit together somehow they often did not do so in the same overall set of six. As an example, the factor matrix indicates that all of the members of the configuration, $E_4I_2S_1H_1F_6D_1$ should be mutually compatible, but the first two factors of that set imply a highly stressed internal condition (substitution of government control for a profit-oriented free enterprise economy within an intensely federalised political pattern) that seems ill-fitted to the extra-exuberant foreign policy implied by F_6.

At the same time as this review of configurations sharply reduced the number of factor sets to be considered, it also brought to light several new sets of factors which clearly seemed to deserve attention even though they had not emerged from the initial, mechanical treatment of the factor matrix. Review of the matrix showed that this usually was caused by a dubious assessment of non-fit between two factors. This experience supports the contention that recycling of each of the steps of analysis should be a normal part of the method.

After many eliminations and a few additions, approximately 40 alternative configurations were left. A selected few of these are presented in Figure 11.

It should be noted here that one of the salient results of pursuing the method outlined here is the development of powerful language in terms of which to discuss the problems involved. Each of the four steps shown in Figure 6 moves another notch toward holistic description and conceptual power. The selection of the initial descriptors is the first such step. The factors place such descriptors into convenient patterns and the analyst finds himself talking to his associates on the project in terms of such things as "E_2I_1" situations. The subsequent combinations of such factors into complete configurations gives a still broader and more useful terminology, since each such configuration represents and schematically identifies a whole future condition that is internally self-consistent, distinctively different from other configurations, and potentially relevant to the interests of policy-makers. With an agreed and thoroughly understood set of configurations to work with, a group can swiftly identify its agreements and disagreements in the tracing out of the alternative lines of future evolution which comprise the next step.

4. A "Tree" of Alternative Lines of Future Evolution

The roster of acceptable configurations were next inspected to see, on a preliminary basis, which ones seemed like candidates

Figure 11 - SAMPLE CONFIGURATION DESCRIPTORS

100 $E_1I_1S_1D_1H_1F_1$. (Status Quo Ante, extended). This is a relatively bouncy exuberant United States pattern similar to that of the 1955 to 1965 decade. It is characterized by a high degree of confidence in the economy and the political system, a United States ability to project its influence throughout the world, an actively questing science, and an expanding technology. The Green Revolution and concomitant administrative and social adjustments avoid wide-spread famine without recourse to compulsory population controls.

101 $E_1I_1S_1D_1H_1F_3$. This is basically the same as No.100 above, but different in the decision on the part of the United States government to make AID and military commitments to selected recipients in the Under-Developed World. This case is one of the possible descriptions of the 1969-1970 world.

106 $E_1I_1S_1D_4H_1F_1$. (An example of "Exuberant Democracy"). This is a later variant of the No.100 and No.101 cases, the main difference lying in the use of available technology to allow the United States population to live in a dispersed manner.

110 $E_1I_1S_3D_1H_1F_2$. (This, like case No.101, is one of the possible ways of describing the present world situation.) The United States has shifted to an AID-only support of the under-developed world while science and technology in the United States have shifted to an emphasis on application of present technology. It is a mild new-left position.

212 $E_6I_1S_3D_1H_5F_4$. (An example of "Satisfied Plenty"). This is a later case of a free enterprise declaration of plenty supported by a much expanded, successful, affluent United States economy. Science and technology generally curtail advance in favour of application. The under-developed world has "solved" its subsistence problems without reliance on a successful Green Revolution, and the United States is partly isolationist.

221 $E_5I_4S_3D_1H_4F_4$. (This case is an endemic welfare stultification). The single party government (perhaps of a caesarist type, or a centrist coalition) but keeping its position in spite of marginal economic success by providing increased welfare services. This is supported by a non-expanding science and technology which devote their energies toward application rather than discovery. Lack of a margin of productive growth curtails United States help to developing nations, thus undercutting the success of the Green Revolution and bringing on chaotic conditions.

234 $E_5I_4S_2D_2H_4F_4$. (A "Garrison State"). This case might be one in which an authoritarian, economic elite controlled the United States, tied by international business connections to the Atlantic community. It might look much the same as Franco's Spain or Salazar's Portugal, as far as internal politics were concerned, with a "law and order" lid put on dissent and science and technology applied to élite security.

for the year 2000 and, more generally, to assign plausible time frames to each configuration. This resulted in about thirty items being tentatively assigned to the 1990-2000 decade, nearly twenty five (including of course some of the first thirty) for the 1980-1990 interval, and about ten for the period between 1970 and 1980. That initial sorting was modified considerably in the course of succeeding steps.

Next, an effort was made to construct individual traces or sequences of evolution linking each individual configuration or "snap shot" of some future condition to the others from which it might plausibly emerge and into which it might change. This was done in two ways. First, a number of the more striking year-2000 configurations were chosen and chains of evolution (defined by intermediate configurations) were visualized leading from the present to each such end point. This approach led to a number of chains of configurations that tended to be broad and multi-valued in the intermediate decade, since each started from a preselected end point and worked back toward one of the few starting points covered by uncertainty as to just where we are at present. Second, alternative near-future configurations were selected and traced into the future by seeing which configurations were plausible outgrowths of each and then working from those new alternatives in a continually widening set of alternatives. The task was finished by seeing which configurations from the set assigned to the 1980-1990 period had not been used at all, and then building traces both forward and backward from those neglected items so as to make connections with traces already laid out.

The culmination of the foregoing steps was a master chart showing all of the several hundred alternative traces (leading from the ill-defined present to a far less specified future) that were considered to be plausible. That master chart was, naturally, very complex, and the final step to be performed at this stage (of construction of a future "tree") was one of synthesis. It called for the gathering together of the thirty end-point configurations into a workable number of sets of similar items, followed by the simplification of the wildly interlacing set of traces of possible sequencing of configurations.

The results of these efforts are shown in Figure 12, where the cases were clustered and then displayed along a continuum running from extreme Faustian competence at the far right to self-defensive ineptitude in the control of external events on the left.

The ordering, in Figure 12, of the nine end points for the year 2000 from left to right is somewhat arbitrary, and their spacing is almost entirely so. It was initially felt, for instance, that the "Socialist Success" set probably should lie to the right of that of "Satisfied Plenty" but when this was tried the resulting figure was more complex than that shown in Figure 12 with more intertwining of limbs. More careful inspection of the factors and configurations involved showed that there was indeed a reason implied in the simpler arrangement of Figure 12: the configurations clustered under "Satisfied Plenty" usually showed a high degree of competence and attention to management, in order that both the satisfaction and the plenty might be present.

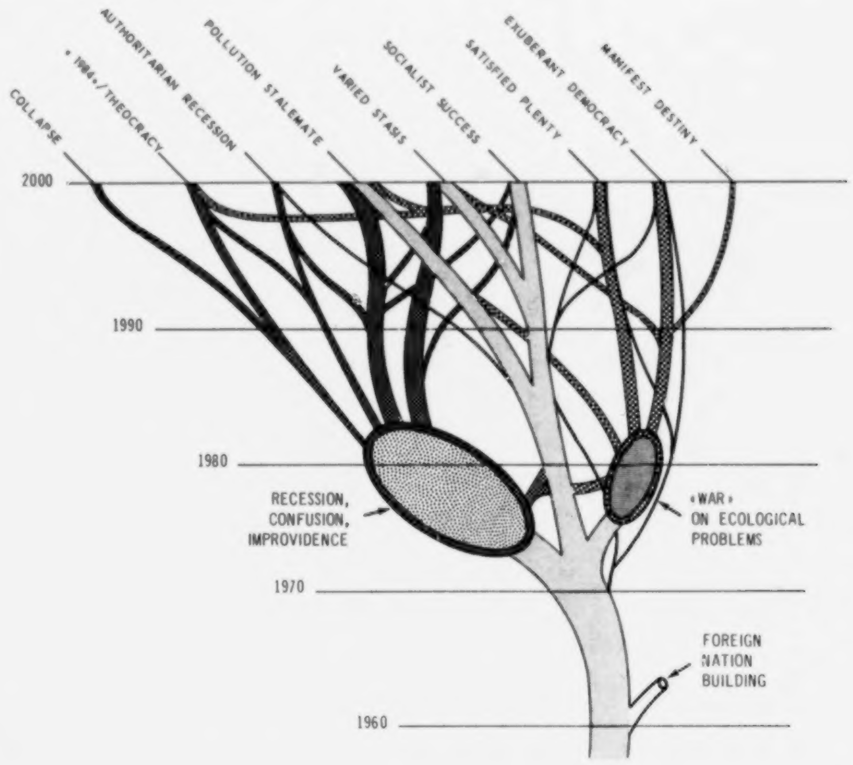
Inspection of the individual traces linking the various configurations to these nine end points showed two seemingly important mid-term fields in which several transient configurations might interrelate in numerous ways and from which many alternative lines of evolution seemed plausible. One was a field of recession, confusion, and/or improvidence from which a few paths reached toward the right half of the figure and most led to the left, including some of the especially dismal future configurations. This field cannot be closely located in time, but it could emerge rather soon; it might well last for a decade or more, and some of the configurations within it could lock in and maintain themselves until the end of the century.

The other field was different in character, containing a number of configurations that suggested a very vigorous national effort in the general field of improvement of imbalances in the human and physical ecology (e.g., such things as urban festers and atmospheric contamination). This led to the tentative prediction that some such intense national effort, comparable to that during World War II, would almost have to intervene between the 1969 pattern and most of the year-2000 options shown to the right on Figure 12, and that such an effort might appropriately be addressed to ecological problems.

The weight of the lines in Figure 12 is intended to reflect, grossly, the relative plausibility of the various branches, as perceived at this stage of analysis. With later injections of NVB considerations into detailed scenarios, such estimates of relative plausibility can be somewhat refined. The assignments of times to the forks and to the dates of maturation of various configurations, that are either explicit or implicit in Figure 12, are grossly

Figure 12

«TREE» OF ALTERNATIVE FUTURE HISTORIES


COLLAPSE
«1984»/THEOCRACY
AUTHORITARIAN RECESSION
POLLUTION STALEMATE
VARIED STASIS
SOCIALIST SUCCESS
SATISFIED PLENTY
EXUBERANT DEMOCRACY
MANIFEST DESTINY
2000
1990
1980
1970
1960
RECESSION, CONFUSION, IMPROVIDENCE
«WAR» ON ECOLOGICAL PROBLEMS
FOREIGN NATION BUILDING

approximate at this point. They too can be improved upon by the same discipline of writing plausible scenarios for each alternative line of evolution and noting the kinds of things that would seem to have to take place between now and 2000 for it to work out as projected.

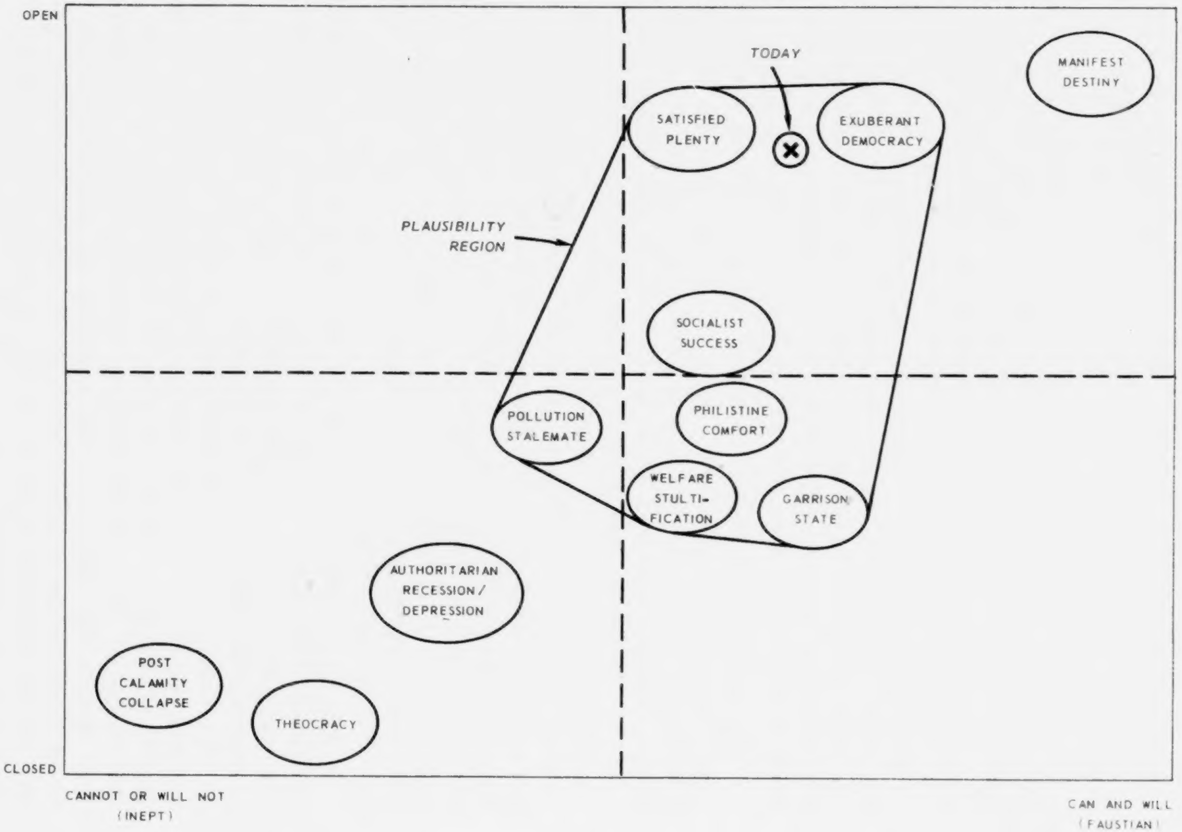
Figure 12 illustrates still another point. As the date marches past a given fork in the tree, major alternative paths that may have seemed plausible earlier are dropped. Such a case is indicated by the broken stem branching off about 1960. The great emphasis by Kennedy and MacNamara upon the merged application of United States military, political, and economic policy tools to the building of United States preferred forms of nationhood among the developing countries was effectively cancelled by Kennedy's assassination, and with it perhaps the most Faustian vector ever pursued by United States national policy.

The Faustian dimension (from "Can and Will" at one extreme to "Can't or Won't" at the other) could be combined with any of several others to convert the display from a two-dimensional one to a solid. Figure 13 shows a cross section at the year 2000 of such a display. The additional dimension chosen is social openness, in the sense of Carl Popper. It will be noted that the alternative futures tend to be distributed along the diagonal, showing a high degree of correlation between openness and Faustianness. Indeed, no configurations at all fall in the quadrant representing concurrent openness and "Can't or Won't". It is not clear whether this represents a coincidence of timing, a significant characteristic of most stable societies, or merely an anomaly to be removed in later cyclings of the analysis.

The contour shown in Figure 13, defined by the four futures, "Exuberant Democracy", "Satisfied Plenty", "Pollution Stalemate", and "Garrison State", designates a region within which the most plausible year-2000 futures are considered to lie. (The location of this boundary is particularly tentative since the plausibility estimations (to be discussed next) are not complete.) The "volume" of the "plausibility cone", of which this region is a year-2000 cross-section, includes the feasible future histories. The definition of this "plausibility cone" (roughly, the region in Figure 12 which contains the thicker lines) is, in a sense, the central result of the analysis, since it bounds the available options and identifies key choices.

Figure 13

«SLICE» OF FIGURE 12 AT YEAR 2000


OPEN
CLOSED
CANNOT OR WILL NOT (INEPT)
CAN AND WILL (FAUSTIAN)
TODAY
MANIFEST DESTINY
SATISFIED PLENTY
EXUBERANT DEMOCRACY
PLAUSIBILITY REGION
SOCIALIST SUCCESS
POLLUTION STALEMATE
PHILISTINE COMFORT
WELFARE STULTI-FICATION
GARRISON STATE
AUTHORITARIAN RECESSION / DEPRESSION
POST CALAMITY COLLAPSE
THEOCRACY

The concept is vital to the overall method, however. As was emphasized at the start, prediction is impossible and will remain so. The only claim that can legitimately be made is to aid the planner by developing a set of projections such that the actual future may be expected to be contained among them. To suggest that one of a small set of alternatives will emerge would be only slightly less arrogant than to say that one particular one will do so. The contention here is that the future seems more likely than not to lie within the plausibility cone whose intercept with the year 2000 is shown in Figure 13.

The Merger of Normative and Non-Normative Projections - Plausibility, Temporal Continuity, and "Flavour": Sample Scenario

This work is not complete. In generating the "tree" of Figure 12 attention was paid to the "flavour" of the various conditions reflected by individual future configurations and to evolutionary (or revolutionary) transition between such configurations, since without such considerations it would have been impossible either to assess the internal self-consistency of individual configurations or even the gross plausibility of alternative lines of evolution. Such efforts have so far, however, been largely implicit rather than explicit and iterative.

Temporal continuity and internal consistency within a field stretching along each projected line of future evolution are just as stringent requirements as lateral self-consistency within such a field at any given time. It is especially important to realize that a mixture of different social forces represented by the NVB sets will characterize each moment along such a line and that changes in the distributions of numbers and social influence among such groups must be explicable if they are to be considered plausible. In other words, the tale representative of each scenario must be a good story line in human terms. When it is suggested that a "fork" appears somewhere on the "tree", the impulse toward some make-or-break decision within society must be reflected in NVB-group relationships, and taking one branch or the other implies an assumption as to the resolution of that issue - a resolution that will form a part of the history of that scenario and will contribute to the nature of all subsequent NVB interactions.

Indeed, the most satisfactory (in the sense of providing bases for meeting criticism) way employed so far for checking on temporal continuity and relative plausibility of alternative projections has been to undergo the discipline of trying to tell a plausible story linking the described conditions along such a line. It frequently occurs, when one undertakes such a task, that along one line it is very easy to imagine several seemingly plausible explanations for projected changes, while another path may require imagining a whole succession of developments each of which seems hard to believe - the sequence of such events being even less believable. The estimates of the dates at which various conditions might emerge correspondingly depend upon such scenario-based analysis, since only after a detailed sequence of events has been laid out can one fairly apply his common sense or historical knowledge to the job of estimating how long each change might plausibly be expected to take.

The estimates of relative plausibility and dates of occurrence reflected in Figures 12 and 13 were derived in this way, from scenarios even more sketchy than the one offered below as an example.

Sample Scenario

Case I: An outline scenario running from the present through a national effort against ecological imbalances in the United States and thence toward a confident, Faustian form of democracy late in the century.

Figure 14 shows a schematic of the events and the sequence of societal configurations to be considered here, together with the assumed timing of such occurrences. The dotted lines refer to lines of development and alternative configurations that appear to be plausible possibilities but which are not pursued in detail here. The numbers refer to those configurations offered as a sample in Figure 11; other such configurations were dealt with as explicitly in the original analysis, but such detail would be out of place here.

As a start, it is assumed that the condition of the United States in 1970 might best be described by a configuration in which it had proved that President Nixon's 1969 estimates as to the views and strength of a "silent majority" were correct(1), as attested by electoral results in 1970. The distribution of the population corresponding to the four NVB sets, both as regards numbers and national influence is not substantially different from that which was obtained in about 1966. Events of the late 1960s have, however, led to a heightened sense of differences among various groups, and associated differences in ideology have taken on a greater significance in United States politics than has been the case through most of the country's recent history.

If no distinctively national effort is called for by external events or leadership, a number of future paths seem plausible, but a return to a feeling of proud national competency within a democratic pattern does not seem to be likely under such circumstances. For future history to follow such a line, it appears almost necessary that the nation engage in some successful, comprehensive, difficult effort(2). A concerted "total war" on imbalances in the human ecology seems to offer the possibility of such an effort, offering both to provide what James called the "moral equivalent of war" and the solution of ecological difficulties that otherwise may interdict all pleasant future alternatives. Such effort is an essential element of the present scenario, and it is assumed to be conducted with patent success between the years 1980 and 1988, with a prior worsening of conditions such as to make both the initial executive decisions and popular response plausible in 1980. A war on pollution is not, of course, the only arena in which this nation could mount a massive national effort but it suffices for the purpose of this scenario.

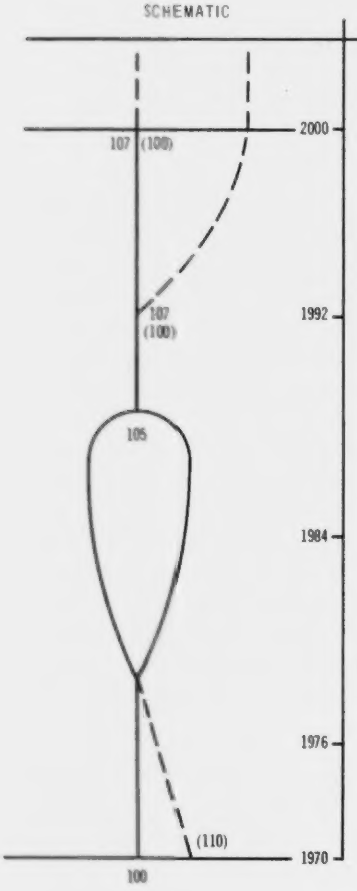
---

(1) This may not be the case, since it is quite possible that the silent majority may prove to have been a myth; in that case, configuration 110 probably offers a better picture of the present. Also pointing toward the 110 alternative, it may be that events in Vietnam and the United States withdrawal from there under adverse conditions could so damage the credibility of this country's foreign pledges that mutual security arrangements with us will be avoided by others whether or not we desire to so commit ourselves to them. If such is the case, it seems likely that NVB Group 2 has taken on considerably greater influence than it had in the past.

(2) This is so because many material and social prerequisites, the lack of which imposes "necessity" upon those who would prefer to choose freely, are unlikely to be provided unless the nation can function as an entity, and that degree of coherence is unlikely (given current divisions) unless people are drawn together by a common activity.

Figure 14

SAMPLE SCENARIO - A COURSE OF EVENTS
LEADING TO «EXUBERANT DEMOCRACY» LATE IN THIS CENTURY



POSSIBLE EVENTS

World population nearly constant at 4 to 5 billion. Underdeveloped countries move toward relative plenty as reinstitution of new agricultural and technical methods feeds into a population well below limits. Developed countries possess broad options of many kinds.

1992 Revert to internal and external U.S. policy vectors generally similar to those of the Kennedy period - confident, horizons unlimited, broad military/economic commitments.

1988 Physical pollution solved and effectively eliminated.

Most underdeveloped countries moving toward population stabilization (through forcible controls) at levels consonant with 1980 gross levels of food production.

1980 Green Revolution disrupted by internal problems in the underdeveloped countries.

1980 National «War on Pollution» declared, with a scope and depth of involvement comparable to that of WWII.

1970 - 1980 Worsening physical pollution; ghetto problems still severe. Escape from Vietnam with continuation of policy of combined military and economic aid to selected developing countries.

Conditions in this country never can be fully defined wholly in terms of internal relations, however, and any adequately inclusive scenario must treat with selected happenings abroad. The course of the race between population and food production and distribution in the underdeveloped countries especially promises to have very heavy impacts upon the flavour of life in the United States of America. Along the line of evolution selected for illustration here, it has been assumed that the promises of the Green Revolution have been largely negated by disorders of various kinds within the potentially hungry areas(1) by about 1980. In this scenario, it also is assumed that most such countries react to such developments by moving toward totalitarian forms of government(2) and instituting compulsory forms of population control that promise to result in stabilized world population at the four to five billion level by the year 2000(3).

The eight-year period of 1980-1988 is of great importance in terms of evolving NVB dynamics. Whether the entry into the effort were from a value pattern similar to that of the period of 1955 to 1965 (as assumed here - largely that represented by the "Materialistic NVB-type") or out of the mild New Left position defined by configuration No. 110 (closer to that represented by the "Person-centred NVB-type"), it seems likely that a large variety of solutions would be attempted. Problems stemming from ecological imbalances of both physical and human types (e.g., pollution and racism) will demand attention and it is expected that both will be attacked regardless of which type of NVB-climate was dominant. For both types it seems reasonable to expect that the values of the populace will be impelled by the mood of national involvement more toward public service than toward private enrichment. "Achievement" then would be interpreted more in social than in personal terms. Something of this sort happened during World War II.

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(1) This is, of course, not the only assumption that could be made here. An alternative involving an optimistic course for the Green Revolution is considered briefly later.

(2) This course of events is suggested by Heilbruner and others, whether or not the promises of the new agriculture prove illusory.

(3) Such a pattern may not be among the most probable, but without such "boot straps" solution of the hunger problem a devolution into chaos would probably result that would, in turn, make a growing mood of confident exuberance in the United States seem very unlikely. There undoubtedly would be repercussions within this country, but existing tendencies toward national introspection would probably have been intensified by American preoccupation with its own "housekeeping"; the feed back from dictatorship abroad seems unlikely to be so severe as to make the overall pattern very unstable.

Successful solutions to the problems of physical pollution will be recognized and will tend to stabilize, being only secondarily dependent on the relationship between the values inherent in the solutions and those dominant in society. The problems of urban ghettos, on the other hand, would be more sensitive to the distribution of values both at the outset of the effort and later on. Due to the socio-emotional aspects of the human problems, solutions will not be as easy to discover or promulgate, will take longer to effect, and will probably not be as stable. Also it must be assumed that the need for cultural changes (which usually tend to be slow if they are not to end in chaotic conditions of a sort incompatible with the line of evolution selected here for illustration), the impossibility of "giving" prosperous self-confidence to any group, and the grave uncertainties that still exist among social engineers as to the tools and procedures to be used in solving ghetto problems, will effectively preclude comprehensive solution within an eight-year period. Efforts on this part of the problem almost certainly would have to carry over into the last decade of this century, but definitive solution of problems of physical pollution should leave both excess resources and a national confidence capable of pursuing a solution to the more demanding problem of social imbalances.

This scenario, then, envisages a transition to economic forms, foreign policies, and political structures reminiscent of those at about the time of President Kennedy. Science and technology would have established strong momenta both in the physical and behavioural sectors and would be confidently expansive on most fronts. The assumption of this or any other "successful" line of evolution calls for the parallel assumption that there is not a thermonuclear war between major powers, but there seems no reason to suppose that competition between the United States and the USSR has been signally reduced, and some form of the Cold War is assumed to exist. This transition might well be accomplished during about the four years after success in the war against pollution, leading to a configuration such as No. 107 by about 1992(1).

The pattern during the last years of the century might remain essentially unchanged from configuration No. 107, since that seems to be a relatively stable alternative, with a combination of resources, internal and foreign commitments, and inherited sets of needs, values, and beliefs that all fit together reasonably well. It would seem more likely that this condition would persist if the "Materialistic" and "Status quo" NVB type values were salient: the relative proportion of the "Poor" might be relatively small within the pattern of over-all plenty, and opportunities for transition into a life style associated with the "Person-centred" type concerns would be relatively open. In terms of future alternatives already richly described in science fiction, this pattern might look like that in Heinlein's Door into Summer.

Or, if the "Person-centred" NVB type values already were dominant by the time the war on pollution had been won, there might be only a brief lingering in some configuration such as No. 107, followed by a transition toward one of the versions of "Satisfied Plenty", featuring in its matured form an economic pattern in which most material wants were satisfied and material production would cease to expand due to a satiation of demand(2).

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(1) If this stage of development were to be reached through a line of development in which there had been no effective stabilization of world population but in which the success of the Green Revolution had permitted the feeding of six or seven billion people who seem likely in that case to exist at the end of the century, the corresponding configuration in about 1992 could be No. 100. There is also the chance that the assumed national effort against pollution and ghetto problems could fail: the attempt might start too late, it might be vitiated through internal conflict, or effective solution may already be beyond reach. Such failure would drive the scenario far away from exuberant confidence into one of the more dismal, unsuccessful future conditions.

(2) It should be noted that there are some NVB anomalies to be considered here. The pattern (107) of technical competency at home and a dictatorially arranged margin between population and resources abroad seems less consonant with the flavour of the "Person-centred" values than with the "Materialist", but it is in this pattern that the material base for a transition into satisfied plenty is most likely to exist. If the line of evolution featured continuing success of the Green Revolution and no positive controls over population, the result would be a fragil sort of human ecology in which the wolf was barely being kept from the door in most parts of the world: the evolution of that pattern seems more nearly consonant with a long period of strong influence from "Person-centred" leadership, but evolution toward a slackening of material production would be improbable.

Fits and Misfits

One of the important aspects of such a scenario is the degree of "fit" or "misfit" of the state of society to the desires of the various NVB types. The word "fit" can mean at least two quite different things in this context. For one thing, there is the question just of internal consistency: "Given this six-letter configuration, what kinds of NVB climate would seem most plausible?" As another quite different question, one might ask "To what degree would this configuration tend to fulfill the needs of different NVB types?" A future may be "poor" but that does not mean that the poor would want to live there. The climate can not adequately be established without considering the ways in which the situation in question might have evolved, although it of course is possible for one group to inherit a situation that was created under other auspices. Two approaches to assessing "fit" are briefly described below. These have no empirical foundation, being based solely on judges' opinions. Their value is essentially as convenient means of meaningfully combining judgments on component ratings.

The first of these is illustrated in Figure 15. Each of a group of judges looks at the detailed description of a postulated configuration and at the descriptions of the four NVB-sets and considers which of those sets, if followed, might be most likely to have brought the condition in question into existence or what type of person might be best fitted to exist within it. A close fit between a particular NVB-set and a given configuration (the same sample set presented in Figure 11) is scored with a double asterisk (**), a less evident association is scored (*), and an apparent non-fit is left blank.

The following paragraph shows, in abbreviated form, the treatment of a typical line item:

> "Satisfied Plenty", Configuration 212: This is a case in which demand within the United States has been partly satiated, so that expansion of the GNP has been greatly slowed down without the implications of non-success that are now implicit in such a levelling. The application of compulsory kinds of control by the underdeveloped countries themselves has stabilized their population at levels such that they can avoid famine without attention from the developed world. This may be a prerequisite to the achievement of a sense of comfortable plenty in the United States during this century, since otherwise the feeding of the world's people may call for a steady increase in productive capacities elsewhere. Physical pollution had

Figure 15 - NVB "CLIMATES" ASSOCIATED WITH PRESENT AND SELECTED ALTERNATIVE FUTURES

General Character Configuration			NVB Climate			
			Materialist	Person-centred	Status quo	Poor
			1	2	3	4
Present						
"Silent Majority"	101	$E_1I_1S_1D_1H_1F_3$	**	*	*	
"Mild New Left"	110	$E_1I_1S_3D_1H_1F_2$	*	**		
Year 2000 - Self-Consistent Futures						
"Exuberant Democracy"	106	$E_1I_1S_1D_4H_1F_1$	**	*		
"Satisfied Plenty"	212	$E_6I_1S_3D_1H_5F_4$		**	*	
"Welfare Stultification"	221	$E_5I_4S_3D_1H_4F_4$			**	*
"Garrison State"	234	$E_5I_4S_2D_2H_4F_4$	**		*	

> been cured earlier, through a national effort on that problem which was previously described. It seems probable that this pattern would fit most easily with a climate such as that exemplified by the "person-centred" NVB-set, but it also could match with a pervasive conservatism looking to the preservation of the newly achieved and comfortable status quo if exuberant growth toward non-material goals were not pursued. This is one of the very few futures which is optimistic from the standpoint of the "poor".

The second method of assessing the degree of fit is somewhat more elaborate, and since the judgments called for are more elemental, may have an advantage in reliability. In this scheme the four NVB-sets, a number of the alternative configurations representative of possible futures, and the three "utopias" investigated, all were scored in terms of seven dimensions of comparison that the statistical investigations showed to be most discriminative of the NVB-sets. Those dimensions are expressed in terms of dichotomous poles. The items scored were "located" in terms of the nearness to one or the other of the poles in each case. The seven were: (1) individualistic vs communal, (2) institutional vs personal, (3) elitist vs egalitarian, (4) personal-rights vs government-constraints, (5) peripheral vs centralized, (6) utilitarian vs aesthetic, and (7) apollonian vs dionysian.

Figure 16 offers an example. Here the estimated tolerance range of a given configuration ("Satisfied Plenty" in this case) is scored laterally along an arbitrary scale of seven between each of the dichotomous poles (shaded area in the figure). Characteristics of the four NVB types are indicated by the zigzag lines. Comparison of the shaded area with the NVB-set lines yields a rough measure of the fits and misfits between NVB-sets and the futures.

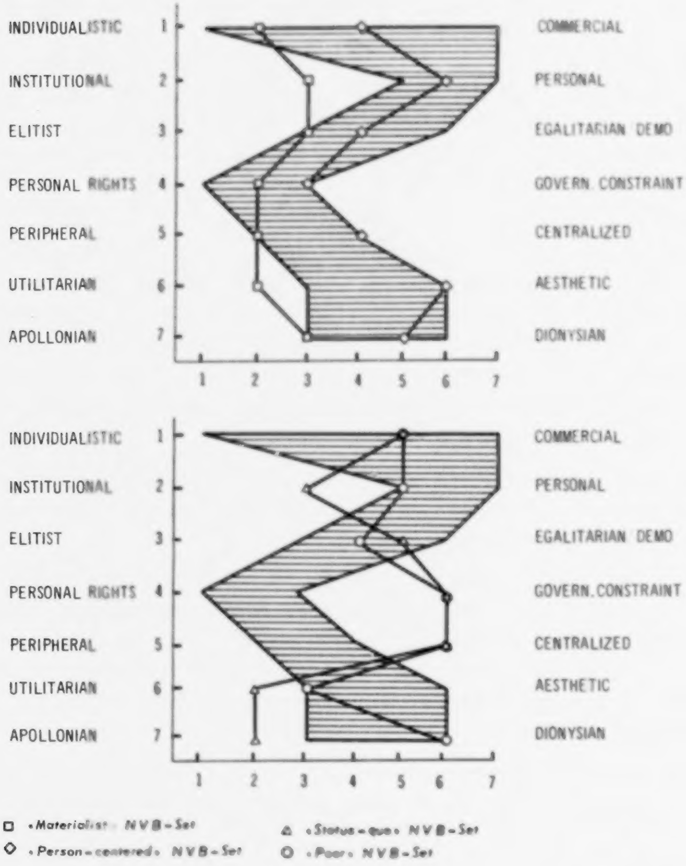
In this example, the shaded area reflecting the characteristics of the "Satisfied Plenty" future clearly accommodates the "Person-centred" type well, and the "Materialist" type somewhat less so. It has a rather poor match with the other two types. The lack of apparent fit of the "poor" NVB-set as judged by the underlying dimensions is somewhat at odds with the prior observation that this is one of the few good futures from the standpoint of the poor.

Analysis of Revolutionary Potentials

The alternative-futures analysis previously described was constrained by an assumption of gradual and non-discontinuous

Figure 16

EXEMPLARY DIMENSIONAL FIT ASSESSMENT



changes in societal functioning and prevailing values. As there is ample evidence of revolutionary fervor in contemporary United States society, the possibilities for discontinuous social change due to attempted revolution were examined in a separate analysis(1). The framework used is a synthesis of treatments by a number of writers(2). In essence it is conceptually based on a hypothesis stated by Chalmers Johnson that "so long as a society's values and beliefs and the realities with which it must deal in order to exist are in harmony with each other, the society is immune from revolution(3)." When this analysis is coupled with that of the preceding section, it is possible to identify potentially explosive misfits between some alternative futures and particular sets of needs, beliefs, and values.

This analysis has attempted to consider 1) the kinds of needs - both personal and social - which must be met by society; 2) the ways in which commonality and compatibility of beliefs and values in society contribute to homeostatic reactions to change; and 3) the typical stages of a society experiencing increasing disequilibrium, the dynamics of their development, and the characteristics of the society at each stage.

In brief summary, the stages of a society experiencing the initial symptoms of disequilibrium appear, from studies of historical revolutionary episodes, to be:

(1) Individual Disorientation. The old answers of society no longer work, at least for some people; hence unpredictability results, and the individual is confronted with conflicting interpretations of events. Providing answers and offering durable ideas are part of the "promise" of many movements which arise in a disequilibrated society.

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(1) This work is reported in more detail in a forthcoming report by Norman McEachron and Connell Persico, "Revolutionary Forces and Social Change: Conceptual Framework and Alternative Futures", Stanford Research Institute, Menlo Park, California.

(2) Chalmers Johnson, Revolutionary Change (Boston, Little, Brown & Co., 1966); T.R.Gurr, Why Men Rebel (Princeton, N.J., Princeton University Press, 1970); Neil J. Smelser, Essays in Sociological Explanation (Englewood Cliffs, N.J., Prentice-Hall, 1968, especially Chapter 10); and Martin Oppenheimer, The Urban Guerrilla, Quadrangle Books, Chicago, 1968.

(3) Chalmers Johnson, op cit, p. 60.

(2) Increasing Individual Deviancy and Normative Dissensus. The personal tensions of social actors experiencing disorientation lead them to deviant behaviour as a means of release. As a result, the norms of the social system are challenged and broken by persons who are neither sick nor criminal. Consequently, laws attain much higher saliency, and it becomes hard for the system to distinguish between dysfunction-inspired protest and behaviour that represents the now-disguised deviancy of criminality or ill health.

(3) Proliferation of Corrective Norms and Organisations (Advanced Complex Societies). In piecemeal attempts to deal with dissynchronizing conditions, increasing reliance is placed by society on governmental and institutional interventions to perform patchwork correctives, including legal sanctions and incentive systems to take the place of now inappropriate values and standards.

As these attempts are observed to be inadequate, society may experience more advanced symptoms of disequilibrium:

(4) Consciousness of Relative Deprivation and Resulting Protest. As personal tensions continue and increase, various social actors come to believe that the cause for these tensions lies not with themselves but with the injustices of society perpetrated on them. This corresponds to the emergence of relative deprivation. Relative deprivation refers to man's perception of discrepancy between his legitimate "want-expectations" and society's willingness to fulfill them. ("Want" here refers to normative desires arising from needs, values and beliefs.) Once an actor comes to feel relative deprivation, he is much more likely to engage self-consciously in protest against perceived injustices.

(5) Emergence of Multiple Ideologies, Politicized Protest and Societel Fragmentation. The need to legitimize protest behaviour and collective reflection leads to ideologies which changes a protester's perception of his situation and which provides him with new norms of behaviour. Alternative value structures are created, many in competition - both with themselves and with the older prevailing system. Mature ideologies have both a goal for societal change and a set of tactics for bringing about the ideal. As a result, ideological protest behaviour has a decidedly political flavour.

(6) Power Deflation. When the trust and confidence which has been supported by shared values breaks down, a process accelerated

by the emergence of competing ideologies, the normal procedures of inducing appropriate behaviour also break down. As a result, the exercise of control by societal authorities comes to rely increasingly on the use of force, and power begins to replace consensual authority.

(7) Crisis in Authority. Power deflation leads directly to challenges of the central social authority's right to maintain a monopoly over the use of force. If the system is unable to develop policies which will maintain the confidence of non-deviant actors in the system and its capacity to move toward resynchronisation of values, a loss of authority will ensue. A police state may maintain "Law and Order" in such a circumstance, but normal social process will continue to break down and the society will begin to decline in viability.

Alternative Future Resolutions to the Current Revolutionary otential in the United States

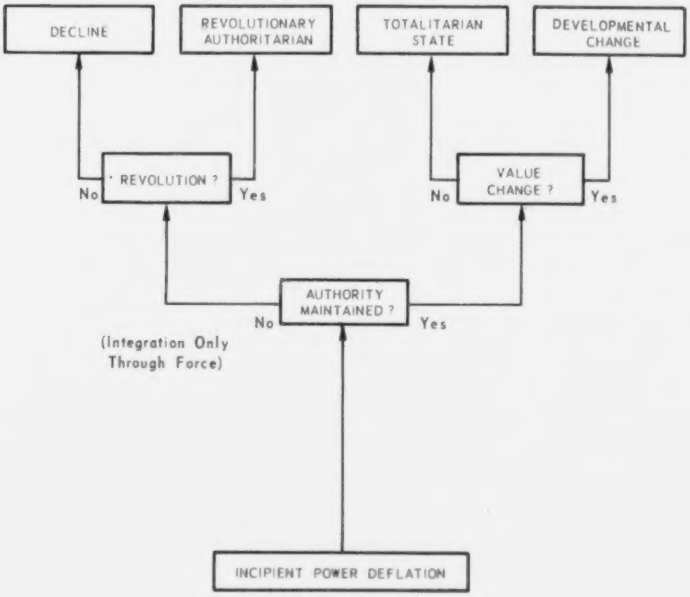
It appears that the United States has entered in the last several years a stage of incipient power deflation, but has by no means yet approached a loss of authority. Hence, a number of options remain open to the nation during the next several decades, as Figure 17 depicts.

The first branching point reflects the possibility that authority may or may not be maintained. If it is lost, as described above, the integration of society will come to rest strictly on the application of force. Thereafter, if revolutionaries can mobilize the population and the regime's armed forces can somehow be neutralized, a revolution can be launched. This action, if successful, will place upon the government the task of resynchronising values and environment (usually through authoritarian measures). Otherwise, society will undergo a period of relative chaos, perhaps convulsed by revolutionary activity which, however, fails to mobilize the population toward resynchronisation of values. Eventually a "Caesarian" authority is maintained. On the other branch, if societal leaders perceive the societal situation as basically one of disequilibrium and respond with effective policies to achieve resynchronisation, then values will be changed radically, but developmentally rather than through a revolution. In contrast, if societal leaders attempt to maintain authority through fear and totalitarian control, their efforts may be temporarily successful without policies to resynchronise. In the long run, however, this branch is unstable: either policies to achieve developmental change will be launched, or authority will eventually be lost.

The results of this analysis of revolutionary pressures correspond almost exactly to the previously described alternative future histories. The right-most branch of Figure 17 (assuming attainment of resynchronisation through maintenance of authority and appropriate value change) leads directly to the more desirable futures depicted in Figure 12 such as "Exuberant Democracy", "Satisfied Plenty", etc. Less happy ways of dealing with the revolutionary pressures appear on the left of both Figures 12 and 17.

Figure 17

SHORT-TERM ALTERNATIVE RESOLUTION OF REVOLUTIONARY FORCES


DECLINE
REVOLUTIONARY AUTHORITARIAN
TOTALITARIAN STATE
DEVELOPMENTAL CHANGE
No
REVOLUTION ?
Yes
No
VALUE CHANGE ?
Yes
AUTHORITY MAINTAINED ?
No
Yes
(Integration Only Through Force)
INCIPIENT POWER DEFLATION

United States 1970 - 1990

IV. IMPLICATIONS FOR EDUCATIONAL POLICY

In this chapter we want to suggest some of the educational policy implications which seem to emerge from the tentative set of alternative future histories. First, however, let us comment briefly on major uses to which such a set can be put.

Uses of a Set of Alternative Future Histories

In general, there are four such types of use:

1. ALTERNATIVE CONTEXTS FOR PLANNING

In the first place, alternative contexts are delineated against which to test proposed policy and within which to develop plans. That is to say, if one had clairvoyant knowledge of the future he certainly would be interested in knowing how present policy choices would look from the vantage point of 10 or 20 years hence. In the absence of that knowledge he can reasonably check with regard to representative plausible alternatives.

For example, as previously noted in the discussion of Figure 12, through 1985 there appears to be three main clusters of alternative paths. One goes through a "slough of despond" characterized by loss of confidence and national will, accompanied by economic depression or dithering improvidence. A second is a projection, more or less, of present trends, with impulses toward economic and cultural growth somewhat predominating over those tending toward chaos or stultification. A third is dominated by an all-out determination to solve the major problems of the ecosystem. An educational planner would be wise to try to live imaginatively in all three of these alternative futures. If his plans seem reasonable in all three, well and good. If they don't fit one, he will be particularly watchful for signs that history might be taking that path.

Each alternative line of future evolution implies distinctive kinds of opportunities and constraints. For example, if the "war on ecological imbalances" stem were to emerge as the actual future, the evolving educational system would probably emphasize national coherence, skills training for the national effort, and a holistic, ecosystem view of the biosphere. It would be embedded in a prosperous economy, and while the needs of the overarching national commitment would come first, the per capita resources for school and educational personnel would probably be as great as, or greater than, at present. Either a technological or a person-centred emphasis might conceivably dominate the early years of the national effort; in the end a balance between the two would probably emerge.

If, on the other hand, the future history turned out to be one of those passing through the "slough of despond", the educational system would have much different forces operating upon it. This condition might be brought about by any of a number of circumstances - by a stubborn adherence to antique economic principles, or by an impatient grasp for piecemeal ecological solutions, or by attempted forms of cultural pluralism for which the populace were not yet prepared, or by a pattern of affluence for which the needed technical productivity had not yet developed. In any event the condition would be one of scarce resources, and high anxiety levels as regards self protection and self support. In a world of hardship and chaos there would be little sympathy for educational approaches more suitable to affluent order.

2. ISOLATION OF PROBLEM AREAS OF THE FUTURE

A related, but conceptually different use of a "tree" of alternative future histories is the identification of probable problem areas of the future. Some problem areas, such as the "world macroproblem" to be discussed below, are sweeping and seem to occur in all alternative future states. Some problem areas such as a rise in authoritarianism, on the other hand, occur only in limited regions of the "planning cone".

The differentiation of sweeping problem areas from those of more limited scope is of greatest importance for long-term planning. The problems which are specific to a given type of future can be avoided by avoiding that future. The problems which are specific to all plausible futures, however, will have to be encountered regardless of what future is attained.

Some such problem areas, including ecological imbalance, United States isolationism and population/subsistence abroad, authoritarianism, and internal violence, will be discussed later in this chapter.

3. IMPROVEMENT IN PLANNED INTERVENTION

An obvious use of the analysis of alternatives - and one which depends on the proceeding two applications - is in the design and execution of policy aimed at increasing the likelihood of avoiding undesirable future histories and of bringing into being a desirable one. For example, we have previously observed in the discussion of Figure 12 that each of the very few paths leading to attractive futures somehow must involve solving at least the most pressing aspects of the "world macroproblem", and also requires a renewed sense of unified national purpose. A "total war" on ecosystemic imbalance provides one of the more promising ways to achieve these two objectives.

Figure 12 graphically illustrates how plausible alternatives become more numerous and diverse as one moves out in time. Hence long-term plans should, insofar as practical constraints permit, be adaptive and contingent rather than specific. A dependable futures "tree" is extremely useful in suggesting hedges of investments which a prudent planner might make. Even a relatively crude and imperfect "tree" may offer significant insight into the need for hedging of some kind. Short-term plans must be specific, but policy choices and plans which are expected to have lifespans of one or more decades must be more general and should insofar as possible be set up so as to facilitate later improvisation.

It is clear that for coordinated planning, the different agencies involved in major policy decisions should use the same "tree" of alternative future histories. (It would be advantageous, for instance, for educational planning in individual OECD nations to be assessed in terms of one common "tree" of world-wide alternatives.)

4. SHORT-TERM SOCIAL INDICATORS

Much attention has been given lately to social indicators. Possession of a futures "tree" permits much crisper definition in this field. In the long run it should prove extremely useful in the choice of a policy-relevant hierarchy of general social indicators.

In the short term the futures "tree" has particular value, since it suggests the high utility of certain special-purpose "early warning" indicators. From Figure 12 it is apparent that an accurate indication of the similarity between the present state and each of the three main stems designated for the 1970-72 period would be of inestimable value. If it were well established, for instance, that the United States actually were tending to move into a semi-permanent condition of recession, confusion, and improvidence, that would radically affect every aspect of educational planning from preferred curricula to projected student loads and available revenue. The holistic descriptions corresponding to these three stems furnish the basis for design of such "early warning" indicators. They would allow much more satisfactory planning than fragmentary indicators of diverse variables.

The World Macroproblem

- Significant overall conclusion

Because so many decisions in educational planning are associated with decade-long time lags, analysis of future alternatives is especially important. Realistic plans must be laid in relation to an embracing context which is representative of the conditions that may exist after the plan is in operation. "Relevance" in 1985 will be determined by the match between education and the ambient circumstances *then*.

Projection of future problems and areas of concern allows delineation of present issues, of decisions among currently feasible courses of action. Some of these issues have to do with planning and monitoring processes; others with substantive choices affected by perceived future problems.

In examining the alternative future histories for anticipated problem areas we found that a startling conclusion emerged. It appears that of the some two score feasible future histories there are very few that manage to avoid one or another kind of time of extremely serious troubles between now and 2050. The few that do require a dramatic shift of values and perceptions in order to deal satisfactorily with what we came to term the "world macroproblem".

This macroproblem will be the predominant concern of the foreseeable future, for all the alternative paths. It is the composite of all the problems which have been brought about by a combination of proliferating knowledge, industrial development unmoderated by social responsibility, and the high population levels which are at once the cause and consequence of increasing human control over the human condition.

(1) Problems of the ecosystem (ecological imbalances, fouling of the environment, resource depletion; overpopulation and consequent famine and plague in underdeveloped regions)

(2) Expanding have/have-not gap (domestically and between nations, with resulting internal and external dissention)

(3) Technological threats (weapons of mass destruction, vulnerability of a complex society to sabotage: new powers to "engineer" the human body, mind, foetus, and genetic transmission; threats to privacy and individual rights; mental stress of complex living)

(4) A crisis in enculturation, threatening the minimal intergenerational transmission of culture that is essential to social continuity.

Of critical importance is the type of response society makes to these problems. Although terms like "environment" and "ecology" have entered the political rhetoric, we have not yet begun to take this world macroproblem seriously. Even among the informed public there is a pronounced tendency to believe that:

(1) New technological breakthroughs will be achieved which will enable us to control pollution.

(2) The "Green Revolution" in agriculture will solve the world food problem.

(3) Technological breakthroughs in contraception will take care of the population explosion.

(4) The deterrence policy will continue to preserve the world from the horrors of nuclear warfare.

(5) International controls will adequately protect against small-nation development and use of biological weapons.

(6) The right programs for urban problems will begin to reduce the severity of the problems of racism in the nation.

(7) The drastically fallen world image of America, from the hope of the oppressed to imperialist oppressor, is a regrettable consequence of our involvement in the Vietnamese conflict, and can be righted by our finding a satisfactory way to extricate ourselves from that situation.

(8) As soon as the Vietnam war is over, we will begin to make steady progress on the serious social and environmental problems which beset us.

(9) When our resources are freed by the end of the Vietnamese war, by supplying capital and American knowhow to the underdeveloped nations, we will begin to close the have/have-not gap which poses a continuing threat to world peace.

(10) As available supplies of physical resources - fresh water, fossil fuels, minerals, etc. - are used up, technological breakthroughs will provide substitutes.

(11) As per capita energy usage continues to rise and conventional power sources (hydroelectric, fossil fuels) to approach limits, technological breakthroughs will result in new energy sources (efficient solar cells, nuclear fusion processes with no side radioactive contaminants) which will fill the demands.

As our work progressed these expectations looked less and less credible. Rather, the various aspects of the world macroproblem looked more and more like surface manifestations of a pathogenic condition much more fundamental. This showed up in the projections of alternative futures, wherein it appeared that desirable "future histories" were hard to come by, and involved significant changes in operative values. It appeared again as we attempted to analyse how the world had got to its present state and began to suspect that it was implicit in the premises of present forms of the technological-industrial state, awaiting only suitable levels of population and technological application to become intolerable. It showed up once again as we grappled with the significance of contemporary revolutionary forces and found that the crucial gap is not that between generation, nor between liberals and conservatives, but between those who anticipate a continuation of present trends and those who insist that a drastic change is absolutely necessary.

Pathogenic Premises

Admittedly the concept of pathogenic premises is a loose one. It is meant to connote that certain aspects of the prevailing (whether explicit or implicit) premises are problem-generating; in other ways they may produce useful consequences. For example, at one time the premise that black persons are subhuman contributed significantly to a thriving agricultural economy in the South. Few today, however, would doubt that it was also pathogenic. Similarly, premises which contributed significantly to our present industrial and technological accomplishments may have pathogenic aspects with present population levels and technological powers. Among these might be listed:

(1) The premise that the pride of families, the power of nations, and the survival of the human species all are to be furthered in the future (as they usually have been in the past) by population increase.

(2) The "technological imperative", that any technology that can be developed, and any knowledge that can be applied, should be.

(3) The premise that the summed knowledge of experts constitutes wisdom, that the integrative arts and sciences are of only secondary importance.

(4) The premise that affluence has arrived, continued access to the many rights accessible to Americans is assured, and the productive establishment is infinitely resiliant.

(5) The reductionist view of man, a premise associated with the development of contemporary science and which lends sanction to dehumanizing ways of thinking about and treating men.

(6) The premise that men are essentially separate, so that little intrinsic responsibility is felt for the effects of present actions on remote individuals or future generations.

(7) The premise that man is separate from nature, and hence that nature is to be exploited and "controlled" rather than cooperated with.

(8) The "economic man" image, leading to an economics based on ever-increasing GNP, consumption, and expenditure of irreplaceable resources.

(9) The premise that the future of the planet can safely be left to autonomous nation-states, operating essentially independently.

(10) The disbelief that "what ought to be" is a meaningful concept and is achievable.

If we are correct in this tentative judgment that the various aspects of the world macroproblem, while they may be ameliorated or postponed by certain technological achievements, are instrinsic in the basic operative premises of present industrialized culture - if this is correct, then it follows that education toward changing those premises is the paramount educational task for the nation and for the world. This involves at least education toward responsible stewardship of life on earth with the associated changes in values and premises. It probably includes adaptation to a new and evolving metaphysic which will support these changes (since values are always rooted in an implicit picture of man-in-relationship-to-this-world), and probably calls for a new alliance between education and law enforcement to help us through a coming time of troubles. And it calls for a resynchronization of values held by presently divergent groups.

We would not pretend that these conclusions are demonstrated. We do claim, however, that if further analysis substantiates this interpretation of our situation, no other educational issues can compare with these in long-range importance. Changing our values and premises is not just a good thing - it is a necessity.

Major United States Problem Areas Related to the World Macroproblem

Several major problems, most of them related to the "macroproblem", pervade the projected alternatives. They are interconnected, so the issues (i.e., near future subjects for decision) associated with each of them form correspondingly interrelated sets. We shall comment briefly below on four of these problems.

1. PROBLEMS FLOWING FROM ECOLOGICAL IMBALANCE WITHIN THE UNITED STATES

This subject appears to be significant along nearly all of the alternative future paths considered, but its policy implications differ from path to path. It is a central problem focus from which educational policy implications are drawn in the next section. The key questions seem to be: a) What is the objective severity of the problem? b) What might be expected to be the nation's response to the problem along various paths, and, for various degrees of objective severity, what might be the consequences of such a response in each case? c) How might the problem shape and be shaped by education? Each of these implies important educational policy issues.

Imbalance within the ecology in this country might be characterized by too many plants growing in Lake Erie or too many people in Los Angeles or by too many chemical compounds of the wrong kind present in air or soil or water. In every case, the test for "too much" lies in the quality of life open to Americans and (less immediately) people in other countries. There can be no doubt that chemical pollution of various kinds already has chipped away significantly at that quality of life, and that related biological imbalances (such as overpopulation of algae or people) also threaten us.

There is, however, considerable uncertainty as to the real urgency of the problem. May it be solved almost casually once national attention has been focused upon it, or is the issue so desperate that scenarios beyond about 1990 are nearly all ones of collapse and disaster? Knowledgeable spokesmen can be found for each viewpoint. The issue remains one in which such differences exist largely because the American emphasis upon specialties of various sorts has almost forbidden serious research concerning complex wholes. The needed study could be initiated in this country's centres of higher learning (although structural reform would be needed in most of them before this could be done effectively), and the habits of mind necessary to follow through on initial studies could be inculcated from the earliest grades. In any case, the salience of the question among the future projections suggests that one of the more urgent issues facing American education concerns the discovery of the real character and seriousness of the problem of ecological imbalance, and the nature of the educational task regarding it.

If, as now seems likely, the problem is neither trivial or desperate, there still are good reasons for acting initially as though it were very difficult to understand and relatively severe. First, it may be severe, and one of the broad avenues toward the less desirable alternatives on the futures "tree" lies in corrective efforts that are too little or too late. Nothing will be lost and much may be gained by starting early with a great deal. Second, whatever the objective severity of the overall problem, the history of efforts to adjust the complex web that makes up any ecology shows that piecemeal interventions have usually proved harmful. One of the high probability ways into chaos consists of premature, unknowledgeable attempts to cure the more evident symptoms of imbalance one at a time. Third, the activity of national response promises itself to be a salutory educational experience for the country and for academia, drawing together the threads of national life whose separateness now is the most threatening single factor in the immediate future, and forcing within academic and student circles an attention to rich interconnectivity and organic continuity that has been spectacularly rare for very many decades.

2. UNITED STATES ISOLATIONISM AND POPULATION SUBSISTENCE ABROAD

Most of the futures projected for the end of the century are ones in which very many - billions - of people in the underdeveloped countries of the world are hungry most of the time or have had their numbers sharply reduced before that date by pervasive famine. As with the problem of ecological imbalance, there are legitimate differences (within the present state of knowledge) as to just how soon the condition may become serious. Only a few extremely optimistic projections suggest that the problem can be postponed into the next century. Nearly all of those few paint a scenario that leaves some seven billion people on earth in the year 2000 living under conditions of extreme ecological fragility, in the sense that any serious natural or social disruption of the order which is prerequisite to those peoples' support might find the earth overpopulated by a factor of two - with no option except death for the excess.

This problem couples most dangerously with a recent tendency toward United States isolationism which is observable both in the "right" and in the "left" political forces in this country. If this trend continues there is little chance that the Green Revolution can succeed in the tropics, and the resulting conditions when our aid is withdrawn are likely to deepen the American impulse to turn away. Such a turning probably would not have the catastrophic economic effects here that Lenin once thought it would but there surely would be substitution costs as trade dried up. Such inefficiencies would force reductions of the American standard of living or of the wealth reinvested to produce future wealth. Recession or welfare stultification would be a possible consequence, cutting still further the material bases of possible help to hungry peoples, and the situation might well drive itself ever downward and inward.

An implication which can be drawn from this analysis is that education which fosters the holistic conception - in world economic and political interdependencies as well as other problem areas - may reduce the short sighted tendencies toward isolationism and lead toward an appreciation of the interconnectedness of decisions in diverse areas.

3. AUTHORITARIANISM

Another problem highlighted by the futures "tree" is that of possible losses of freedom to one or another kind of authoritarianism. Most, but not all, of the paths of that sort take their departure from an élite seizure of power under straitened conditions, so the majority of such cases are to be found toward the inept (i.e., left) side of Figure 12. In a few cases, however, the ineptitude is the consequence rather than the cause of the authoritarianism, as when society splits into antagonistic subcultures in a premature, ideologically dominated kind of cultural pluralism, leading to outright intergroup warfare or to a dithering impotency which invites the services of a "Caesar".

A number of educational policy implications can be drawn from this aspect of the futures "tree". For adult education, it would seem to suggest attention to historical instances in which freedom has been voted away, to the ways in which self-appointed élites have in the past drifted into megalomania, and to the opportunities opened to conspirators when a nation's groups bicker among themselves. Similarly in college and high school curricula the ways might be brought out in which anti-democratic means have corrupted otherwise admirable efforts toward reform and gone further and cost even the freedoms that had existed before the attempt. The rise of Hitler (partly out of the impatiences of Weimar) is an important case in point. In planning for the lower grades, we might do worse than to revisit John Dewey on democracy and education.

4. VIOLENCE WITHIN AMERICA

Closely allied with authoritarianism, élite arrogance, and ecological imbalances are problems of political violence. It is a short step from stamping down the words of an unpopular speaker to stomping out his life. It is a progressive extension of an existing condition when groups move from the violation of due process in minor ways to the outright formation of private political armies. And it can come as no surprise if the proven efficacy of the knife in slum surroundings leads to adoption of assassination as a political tool.

Descriptors of socially pervasive or politicized violence were not explicit in the factors used to project future alternatives, and therefore such conditions did not show up vividly in the descriptions of those alternatives. They are there, however, underlying most of the less desirable and more chaotic alternatives. Indeed, in some of the future histories it appears that two major educational concerns will be adaptation of the instructional processes to conditions in which the "Blackboard Jungle" is common rather than exceptional, and the direct use of education to reduce the level and severity of violence in the society and its politico-economic life.

Societal Tasks and their Educational Components

The preceding sections outlined several different uses to which a set of alternative future histories could be put and demonstrated several sweeping problem areas, each of which could be used as a basis from which to derive policy implications for education as well as other policy areas.

If the set of alternatives reported here (or something like them) are the contexts within which we are to allocate limited education resources - psychic, human, and economic - then what sorts of detailed policy implications are suggested? The following discussion is from the standpoint of fostering a "war on ecosystem imbalances" (social as well as physical), (right major stem of Figure 12), and avoiding the "slough of despond" (left major stem). This seems not only to be an eminently reasonable position, but is also directly in line with the President's 1970 State of the Union message. (In adopting a national focus of analysis we are trying to present a framework for thinking, rather than specific policy proposals. Hence the analysis should not be irrelevant for an international audience.)

The matrix of Figure 18 contains headings along the top which indicate various educational areas in which a given social task may impact. The listings in the left column are major social tasks suggested by the array of alternative future histories. Elements in the matrix indicate aspects of the educational components of these societal tasks. The discussion below is arranged as though the matrix were being scanned horizontally.

Figure 18 - MATRIX OF SOCIAL TASKS AND EDUCATIONAL COMPONENTS

Societal task	a. New Conceptualizations	b. Research and Development	c. Institutions	d. Educational environments	e. Programme content, resources	f. Processes
	Aspects of the educational component of societal tasks					
1. Make direct attack on aspects of the world macroproblem						
2. Control technological development and application						
3. Alter values, perceptions/and premises						
4. Establish a new sense of national purpose						
5. Meet the educational demands of varied groups						
6. Educate for coping with an uncertain future						

1. MAKE DIRECT ATTACK ON THE WORLD MACROPROBLEM

If indeed the world macroproblem is as represented, its solution is the paramount societal task before us. Undoubtedly a direct attack on specific aspects must be made. The implications of locating the roots of the problem in basic belief-and-value premises will be examined later on.

a. New conceptualizations required for dealing with the world macroproblem include preeminently that of the entire biosphere as a closed ecosystem in which human culture has become a significant part of the system. We need gross models for a homeostatic world ecological balance, and a long-term strategy for reducing the have/have-not gap within the nation and in the world.

A new concept of education is demanded which includes development of those attitudes conducive to survival of human civilization and an overall high quality of life. Training is especially needed in making that combination of reality perception and value judgment which Geoffrey Vickers has termed "appreciation", and in dealing with complex wholes - in viewing self and social situation in their full ecological, cultural, and historical context.

b. The most urgent research task suggested directly by the alternative future histories is the establishing of the degree of seriousness of the world macroproblem. There can be no doubt as to the reality of the various aspects of the problem. Considerable disagreement among observers exists as regards the real urgency. We need to know.

One apparent policy move is to mobilize the education and research resources of the nation's universities for a massive, trans-disciplinary, problem-centred approach on environmental, population, and anti-poverty aspects. This is no simple matter. Our universities have little tradition of either multidisciplinary or problem-centred research or education. They are not equipped and do not train for looking at complex wholes. They tend to be enamored of technological cures for human problems.

Sociology in the university has significantly lessened its earlier emphasis on the semiphilosophical "humanities" approach in favour of an emphasis on techniques and empirical studies, based on a premise that man is a creature of his drives, habits, and social roles. In psychology this view is likely to be even more explicit, with consciousness considered to be an inconsequential accompaniment to behaviour governed by external stimuli and instinctive urges. Political science tends to focus on the processes by which public policies are made, and to be relatively little concerned with their contents. Amid the measurement of attitudes, population movements, organisational trends, political behaviour and the modelling of society and governments, little attention is given to the historic questions relating to man, his condition and his destiny. Even less attention is given to the man-earth whole, to the politics of the biosphere.

This is simply to say that the nation's universities were not designed to perform problem-centred research for society at large. If they are going to be so used, numerous aspects need re-examination and probable alteration, including reward system, departmentalized structure, subject-matter divisions and operative values. The inadequacy of techno-scientific values and premises for the guiding of human affairs is one of the central matters at issue. Thus it is important to recognize that research funding given to universities to work on aspects of the world macroproblem could, in the absence of a thorough re-examination of basic premises and values, add to the problem rather than to its solution.

A second research task, also obvious and also following directly from the "tree" of future histories, is design of specific short-term social indicators as "early warning" detectors to show along which "stem" the society is trending over the period 1970-75. Such a research task could be a precursor to development of a more complete set of indicators for monitoring the state of society.

c. The nature of the macroproblem, and the above remarks on the unsuitability of present university institutions and procedures for responding to the need, suggest the desirability of fostering, in a few selected universities, creation of institutional forms suited to holistic research attacks on the overall problem (such as a Planetary Policy Research Center, either university-based or with multi-university support, a macroproblem-solving research activity as a joint undertaking with a nonprofit research institute, etc.). The precedent of universities responding to defense research needs after World War II offers some guides and cautions.

As regards the educational task, institutional innovations are needed to facilitate trans-disciplinary, future-oriented, problem-centred studies.

d. At all educational levels educational environments are needed that foster comprehension of complex wholes and of specifics in total context, and particularly of the biosphere and its elements in total historic-geographic context. This implies two things in particular. The effective environment needs to be extended outside the traditional classroom to include the entire life space of the student - the out-of-doors, the inner city, the social institutions which affect him, the mass media. The attitudinal climate needs to be one that frees the student emotionally to struggle with problems for which there are not easy and specific solutions, to adjust to or cope with uncertainties, and to anticipate contingencies.

e. In view of the world macroproblem, the foremost educational need is to train in ecological thinking and appreciation of human diversity from the primary grades. At all levels there is a need for holistic, future-oriented, trans-disciplinary, problem-centred, change-oriented study of human problems, for an understanding of complex wholes and historical parallels.

Equally needed at all levels is continuing study, with progressively more sophisticated conceptual tools, of the broad human questions of justice and equality of opportunity, of individual liberty to seek fulfilment, of local and world community, of human dignity.

f. The most obvious implication from the foregoing is that problem-centred education and inquiry training deserve far greater emphasis than they have had in the past. In particular, citizens of all ages need training in dealing with complex wholes and in applying common sense to graspable pieces. This is not only to keep them from being at the mercy of demagogues, but also so they will not feel impotent in the face of expertise, thus delegating the responsibilities of citizenship to thinktanks and bureaucratic agencies. Among the promising educational processes for accomplishing these aims are simulation exercises and gaming, and alternative-futures exercises.

2. CONTROL TECHNOLOGICAL DEVELOPMENT AND APPLICATION

Like the first task, this is outside the domain of education proper. However education can play a facilitating role. If the macroproblem is a consequence of population plus technology, and would be present even if population were stabilized at present levels, it becomes clear that some form of control is required over technological development and application. Furthermore, this control, to be effective, would have to involve not only this nation, but the entire developed world.

Control from the top down is well known not to be very effective unless there is also a widely shared belief in the desirability of such control. This belief does not exist at present. Only after we have educated ourselves to appreciation of the necessity for such collaborative control will it become a feasible step to take.

a. The world macroproblem demands new concepts of supranational organisations for environmental control, coordinated industrial development and poverty alleviation, and control of technological developments which can threaten individual rights or world stability (nuclear and biological weapons of mass destruction; biotechnology for altering the human body, mind, foetus, and genes; surveillance devices; etc.). It seems apparent that nationalism has to be supplemented by a concept of planetary control organisation, a central aim of which will be to foster the use of technology and industrialization in the service of a higher quality of life in a broad humanistic sense.

b. Research into planetary management structures and techniques, and large-scale conflict resolution, seems called for.

c. The need for new supranational organisations, having enough delegated power to accomplish their essential tasks, is mentioned above. Education planning organisations and educational networks covering the industrialized world may be needed eventually to help prepare for taking planetary responsibility.

d. In addition to educational environments mentioned in other sections of this discussion, special attention might be paid to internships and similar arrangements for gaining experience with supranational deliberations (e.g., in United Nations, NATO, OECD, UNESCO, international business corporations, etc.).

e. Development of holistic courses in planetary history-geography-ecology, supranational organisations, conflict resolution, regional and planetary management, etc., is obviously relevant.

f. Comments under 6(e) and 6(f) below apply here.

3. ALTER VALUES, PERCEPTIONS, AND PREMISES

As discussed earlier in the section entitled "pathogenic premises", the world macroproblem will not be solved by top-down control of population and technology alone: specific changes in basic premises, perceptions, and values will be required. In particular, emotional as well as intellectual awareness is needed of the ineluctable fact that we are one race, on one planet, with total responsibility for the future of both. Some sets of operative values are compatible with the fulfilment of man's potential and the achieving of a high quality of life; others are not.

Undertaking this task implies the engagement of emotional and conative, as well as cognitive, faculties. It is not enough that we be intellectually aware that nationalism is now a suicidal course, or that altered values are required if the course of the increasing have/have-not gap is to be reversed. If deeply-held premises and values are to be reexamined for possible change, educational experiences must be contemplated which are akin to psychotherapy in that they aim at bringing the individual into closer touch with himself. In such inner exploration he may discover a _felt_ realization of the inevitability of one inseparable world, and a _felt_ shift in his deepest personal values and most basic premises. This means bringing into education _really_ what the recent talk about the "affective domain" was only hinting at. To be sure, the risk exists that this will not always be done with due respect for the individual's basic right not to be manipulated. This must be weighed against the other risks of not making such value re-examination a part of education.

_a_. The major concept to be dealt with in this societal task is that of new pathogenic aspects of centuries-old cultural premises. Given the basic factor - increased domain of human control - which makes the future so different from the past, _the_ paramount research and educational task is the re-examination of those premises, _especially_ those which seem so self-apparent as to be beyond question.

A brief list of candidates for such re-examination was presented earlier. One in particular seems worth singling out for special attention. This is the premise that the "mechanomorphic" or machine-like view of man and his world (which has proved an extremely useful model for some purposes) is a _necessary_ outcome of systematizing exploration of that world in an open-minded spirit of inquiry. By mechanomorphic we mean to imply the following characteristics:

- the assumption that the true way to know something is from objective examination;
- the trust in impersonal over humane bases for judgment in human problems - e.g., "the scientific method", chance (as in the draft lottery), legalisms, statistical frequency (viz. Kinsey), etc.;
- narrowed range of appreciated experience - emphasis on rational-cognitive functioning and on manual-motor actions, with less significance attached to sensual, aesthetic, relational, mystical, affective, and reverential aspects of experience, to states of being and being-in-process;
- along with this, a devaluation of life as an art, of play, of rituals and festivals, of unfettered curiosity about the unexplored, of activities that are not "useful";
- absence of a deep feeling of being a part of nature and of the evolutionary life process.

b. Two obvious research tasks follow from the preceding analysis of pathogenic premises and values. One has to do with the processes of change; the other with the question of what to change toward.

The area of person-changing processes has been enthusiastically explored in recent years, by social scientists and psychotherapists, by persons interested in executive development and organisational change, and by a mixed group of "humanistic psychologists" and participants in the "growth centres" movement. Further research is needed to systematize what has been learned and to explore forms appropriate to the structures and aims of formal education; also in the area of emotional and conative development, of adults as well as children.

Among basic research tasks, the highest priority - in the light of the foregoing analysis - attaches to the possibility of developing what might be termed a new "moral science", supplementing the existent physical, biological, and social sciences. We use this term to indicate the possibility of a systematized and empirical body of knowledge relating to a natural, organismic base for an organised valuing process within the human individual. It would, in effect, transfer the questions of the nature of the good life and the good society (for man on Earth) into the realm of empirical inquiry, somewhat as questions about wholesome (holy) diet were transferred from the realm of religion to the realm of science. The beginnings of such a moral science may be represented in the works of such psychologists as Carl Rogers, Abraham Maslow, and Clare Graves. Other clues may be found in anthropological studies, in research in psychotherapy, and in recent research on altered states of consciousness. If such a moral science were to materialize, its survival value could be extraordinarily high. It could revolutionize much of educational thought, and markedly affect society's goals for its educational institutions.

c. A greater diversity of types of educational institutions are needed, both to encourage and facilitate experimentation with altering premises and values, and to better match processes with types of children. Further discussion of this point will be postponed to 5(c).

d. Educational environments for facilitating re-examination of basic premises, values, attitudes, and perceptions tend to be characterized by a non-evaluative, low-threat, open, permissive atmosphere, wherein individual perceptions and feelings are at least as important agenda as knowledge about values and beliefs, and wherein the individual feels safe in considering the possibility of change. A key element in the environment is the openness and non-defensiveness of the teacher or group leader. Clearly, to provide such environments in the formal school system implies significant departure from the traditional classroom and administrative patterns, as well as special teacher training.

If by "educational environment" we mean any deliberate attempt to increase knowledge and awareness, and alter values, this includes much more than the public and private school systems. Using the word in this expanded sense for a moment, it is interesting to consider what educational influences have produced the most significant impact on youth in the last decade. If we had the data available, we would likely find that the intended effect of schools ranked very low. (The prison-farm atmosphere, competitive examinations and irrelevant makework of some inner-city schools has no doubt made considerable impact, but this was unintended.) Perhaps the two top-ranking influences would be the worldwide network of rock music radio stations, and TV commercials. The role of the rock stations as a communication network for youth revolutionary forces throughout the developed world has been considerable. As we look toward technologies of the future, one in particular commands attention in this respect - electronic video recording (EVR). If these taped programmes, selling for something like the present cost of a record album, are to supplant TV and rock records for the young (and especially the latter as an evolutionary medium, for like rock records, EVR can be produced by a relatively low-capital company) they are of the greatest interest to those who would affect the minds of the young. This might well include the United States Office of Education and State Departments of Education.

e. As is apparent from the above discussion, what characterizes education toward re-examination of premises and values is not so much content - which might cover a wide range of relevant material - but, rather, "upending" cognitive, perceptive, and evaluative experiences, and opportunities conducive to "unlearning" in order to be free to adopt a new response pattern or perception. In spite of the fact that a great diversity of content can be adapted to this purpose, two types appear especially useful. One is the history and present experience of the individual himself. The second is the intellectual history of mankind, which is replete with examples of "obvious" and "self-evident" beliefs and perceptions which were either demonstrably (in retrospect) pathogenic or for other reasons were rejected by future generations.

Although mentioned before, the need to comprehend the notion of complex wholes, and the associated concepts of total context and of contingent thinking, is such as to deserve further emphasis. The tendency toward specialization and parochialism in subject areas is contrary to the demands of a future in which rationally purposeful choice requires an ability to consider an ever increasing number of complex and dynamic interrelationships. Both the trained ability to deal with human reality in terms of complex wholes, and the ability to adjust to or cope with uncertainties and to anticipate contingencies, are essential educational achievements of the competent and responsible citizen. Reintroduction or strengthening of the areas of history and geography as spatial and temporal contexts for today's problems might prove a fruitful course.

f. Processes are required that foster openness, authenticity, free exploration and willingness to risk, and that are supportive of the individual while he re-examines deeply-held values, perceptions, and premises. As is noted in 3 b. above, much is known about such processes, although the systematization of such knowledge has not been adequate.

4. ESTABLISH A SENSE OF NATIONAL PURPOSE

While the precise historical reasons may not have been established, it is apparent that the nation is seriously fractionated and very likely is trending toward still further dissension. Today's youth deeply questions the meaning of the nation's policies and apparent aims. A significant fraction of the population - largely minority groups and youth - have concluded that established authority on national and local levels is illegitimate - that is, it does not adequately represent their interests, and it is not based on trust, nor on a general consensus. "Middle Americans" are no longer silent about their complaints.

The world macroproblem will demand a national unity if it is to be solved - that is, if we are to avoid a drastically lowered overall quality of life. But, on the other hand the exigencies of the crisis could be the occasion for the nation's coming together with a new sense of common purpose and, in the process, reaffirming the original declared goals, to bring a "new order" into the world for all mankind.

The alternative future histories make it clear that the decade ahead is likely to be one of considerable turmoil, with society sensing not only that fateful choices are being made, but also that its ability to plan and implement actions may be less than adequate for the tasks required. Two things appear essential if the nation is to hold together during these trying times. One is a clear and compelling national purpose, to take responsibility for the future of the planet and of the human race, and to make steady progress toward the goals of reducing injustice and preserving individual rights. The other is a determination to insure that those goals are carefully guarded in the process of providing the necessary force to preserve law and order.

a. Three concepts will aid education to make its best contribution in this area. They are:

- Education for coping with a troubled and uncertain future (see Task 6 below);
- Education to meet the educational demands of varied groups (see Task 5 below);

- Education toward a new national image, suggesting a new relationship between education and law enforcement.

The first two of these will be discussed presently. The third has to do with recognizing an area where education and law enforcement have a common task.

Among the most urgent tasks for this nation are the restoration of the image of America as a provider of moral leadership and as an advancer of civilization, the development of a sense of the legitimacy of established authority, and the commitment to reservation of those fragile and hard-won political institutions which have evolved within Western political tradition for the protection of individual rights and the fostering of liberty and justice. Within these broad boundaries are tasks of reform for law enforcement agencies, for the political leadership, and for the policy as a whole. Within these national tasks, also, are some which can best be carried out by collaboration, at local as well as state and Federal levels, of law enforcement and educational agencies.

These last include increasing appreciation of the need to preserve and protect our democratic institutions, developing the image of the law enforcement officer as impartial protector of individual rights and safety, educating citizens and communities to demand (and be willing to pay for recruitment and training of) a police force of exceptional character and ability, and increasing appreciation of the historical and worldwide uniqueness and significance of the founding of the United States.

The basic assumptions, values and goals implicit in the nation's founding clearly fail to inspire the allegiance they did some generations ago. One reason for this is the widespread opinion, particularly among the young, that the nation has grossly failed to behave in accordance with them. A second reason is more deeply rooted and may partially account for the first. This is the widely held belief that modern science has shown to be a myth the fundamental premises implicit in the Western political tradition - that the universe has a moral order, discoverable by man: that man is, by virtue of his transcendental nature, endowed with reason, will, and a valid sense of value: that in some transcendental sense all men are created free and equal: that evolution and history are ultimately purposeful. In short, the metaphysic that supported the founding of the nation no longer prevails.

This presents a profound dilemma. The concept of a transcendental, choosing, ultimately responsible self is essential to the entire theory of democratic government. It underlies the assumption that the criminal is responsible for his act. It is basic to the assumption in the judicial process that the judge can meaningfully make a normative judgment. Significantly, the "new moral science" discussed in 3(b) above, insofar as it has been developed at this time, tends to reaffirm the metaphysic of the founders.

b. Several areas of research emphasis are suggested by the above. We need to understand better the causes of the crisis in authority, and of the rapidly rising dissidence over the past decade. Schools and colleges will no doubt continue to be focal points for expressed dissent and discontent; the law has been weakened through a multiplicity of events, ranging from excessive tolerance of illegal rights infringements by radicals to enactment of unenforceable laws such as those relating to sexual practices and drug use. Given these two factors, research is needed on the problem of how to preserve an atmosphere conducive to learning in our secondary schools and colleges. Still another research task has to do with exploration of ways in which educational and enforcement agencies can collaborate on tasks of concern to both.

The dilemma of the "displaced metaphysic" underscores the significance of research in the "new moral science", particularly in the area of altered states of consciousness. Because of the highly exploratory nature of this research, together with its extremely great potential importance, consideration should probably be given to a long-term funding commitment with expectation of limited early payoff. Criteria for evaluating quality of research may have to be somewhat modified from those used in the behavioural science area in general, since it is intrinsic to these investigations that some of the implicit premises of conventional behavioural-science research are among those challenged in the new exploratory work.

c. All sorts of top-down efforts to generate a sense of national purpose are suspect among dissidents. Thus it is well to be wary about institutionalizing the process. A national educational effort toward coherence and common purpose, largely outside the formal educational system, in connection with the forthcoming Bicentennial Celebration, would seem to be a promising approach.

Institutional collaboration between educational and law enforcement agencies was mentioned above.

d. The discussion above suggests supplementation with educational environments outside the school such as legislative and judicial proceedings, police patrols, research participation on aspects of the world macroproblem, etc.: also programmes involving teachers acting as sheriff's deputies, police performing teaching services, etc.

e. On the subject of relevant educational content there is little to be added to what was previously stated.

f. The same holds true of processes.

5. MEET THE EDUCATIONAL DEMANDS OF VARIED GROUPS

In the course of working with the dynamics of the alternative future paths we found it necessary to consider the interactions between four different major stakeholder groups in society. These four groups tend to have significantly different educational demands. While there is no great precision in the grouping, the listing serves to highlight educational demands which are not being met:

1 - The poor and disenfranchised

Basic demand: To partake of the affluence of American society.

Educational demands: Effective teaching of cognitive skills and development of achievement motivation which will facilitate obtaining satisfactory employment and inclusion in the mainstream of society.

2 - Status-quo oriented "middle America"

Basic demand: Maintaining traditional values, preserving and insuring security (economic and political).

Educational demands: Conservatism; passing on the ideals of the past; competent teaching of traditional content.

3 - Materialist/esteem oriented

Basic demand: Foster material and technical development of American society.

Educational demands: Technologically progressive but structured education; diversity of goals and processes; individualized learning opportunities for the gifted.

4 - Humanistic, person-centred

Basic demand: Foster a world environment conducive to individual growth and community.

Educational demands: Open, pluralistic education to meet varied needs: expanded educational goals, areas of concern, and methods: divergent institutions and processes.

The schools tend to be geared to the demands of the second and third groups. Even here evidence suggests that creative, imaginative thought tends to be stifled. The perception of the first and last groups that their educational needs are not being met is contributing significantly to current discontent and alienation.

a. In the case of the first group, the poor, it is particularly important to place the problem in a broader context than just curriculum and teaching methods. To be poor is to be out of the mainstream not only economically but also in terms of political power and limited ability to control one's environment and future. Whatever the origins of the social syndrome of poverty, its characteristics of despair, hopelessness, powerlessness, and failure create expectations - in the poor themselves, in children and their teachers, and in those who come in contact with the poor - that tend to perpetuate the syndrome. Schools geared to middle-class, white-majority experiences and learning patterns engender frustrations in minority-group children that further reinforce the patterns.

Some experimental programs have been developed to eliminate these effects of negative expectations and middle-class learning environments. What has not changed, however, no matter what form of compensatory education is provided, is the underlying requirement placed on schools by society to "sort out" the more capable from the less capable students on specific academic bases. When poor children accept the labels from the sorting process, and with them the grounds for assigning those labels, they end up as failures in their own eyes and in those of society. Even the best special programmes can be of little help after the special situation ends, and sorting and labelling begins again.

Thus, some fundamental change seems called for with regard to the sorting and labelling function of the school and its interference with the educational function. This dual function has deep roots in the economic organisation of the society, and any change will come slowly. In the short run, perhaps the pernicious effects of the sorting and labelling process can be counteracted by fostering in the child a disbelief that it affects his essential worth. Through support of the child as a person, apart from his competences or lack of them, he can be encouraged in his natural desires to learn about and make sense out of his environment, to play, and to grow. Such support is difficult because those who would teach children to "disbelieve" labelling and sorting must exist within the labelling and sorting system itself. The current demands for community control, or separate "community" schools, represent attempts to meet this problem.

This concept of the inherent conflict between the sorting and labelling and the educational functions of the schools has important application to current attempts to enforce racial integration in the schools to right an imbalance in educational opportunity. Racial mixing will accomplish little if the failure/success labels maintain the segregation at the classroom level.

The failure of education to meet the needs of the poor may profitably be viewed in the light of another conceptualization that has received wide acceptance in the field of psychotherapy. This is the concept of unconscious intent. The idea is widely familiar that the accident-prone victim unconsciously intends his accidents, that the "unintended consequences" of the neurotic's acts are intended at an unconscious level. Extending the same principle to social problems suggests that a partial explanation for repeated failures in attempts to improve education for black ghetto youngsters may be sought in the unconscious intents and expectations of the white majority population.

A different kind of problem is posed by the alienation from educational institutions of the fourth group, the humanistically oriented segment. These are the youth who reject the materialist values and protest the psychological oppression of the establishment in favour of an outlook putting high value on the world of inner experience, the integrity of the individual, and the community. The "Great Refusal" has a number of faces, but one aspect is in essence a proposal to replace the type of basic premises that were earlier noted to be, in some sense, pathogenic. Furthermore, these replacement premises tend to be supported by a "New Age" metaphysic, which has some of its roots in Eastern religious philosophies. To the extent that "The Age of Aquarius" thrust represents a growing force toward the transformation of man and society, it deserves serious attention. Every educational policy decision, whether advertently or not, implicitly aids the "new reformation" or acts to suppress it. In such times, it may be particularly crucial to distinguish carefully between reforming and destructive forces, both of which may be somewhat uncomfortable to live with. Not only the preservation of civil order, but also the manner in which it is done, assumes unusual significance. If we are in the midst of a period of transition comparable to that of the Protestant Reformation in the depths to which it shakes the social institutions, then the issue becomes whether society can round the bend or is thrown off the tracks in the attempt.

b. As indicated above, little is really known about the importance of racial mixing relative to other factors that may contribute to the difficulties of poor children in school. Research is badly needed to give a more definitive answer as to the relative effects on intellectual potentiality and achievement of nutrition of mother and infant, infant fondling, early-childhood sensory experience, home emotional climate, primary-level teaching methods, remedial measures, etc. From a cost-benefit standpoint it could well turn out that the cost of seeing that mothers and infants are well fed and that mothers or surrogates can afford time to fondle their infants would be extremely cost-effective in the light of later social costs related to mental retardation and emotional and character disorders. These considerations suggest that, while the "right to read" is a significant political goal, as a research goal it may not lead to a sufficiently basic framing of the questions.

Turning to the demands of the humanist group, we see what may be the beginnings of a significant counter-culture movement in the new "free schools", where anti-establishment attitudes are taught along with the "human potentialities" emphasis. The size and vocality of this group appears to be increasing rapidly. They protest, in particular, sorting and labelling of human beings, the cult of expertise, and academic-intellectual "irrelevance".

The varied demands, and consequent discontent, strongly suggest the desirability of experimenting with divergent educational institutions, taking a pluralistic approach with respect to educational structures, teacher training, curriculum, and educational processes.

_c_. One way of accommodating these diverse demands is through a diversity of institutions, in some way made available at comparable cost to the user (through revenue sharing, voucher system, etc.). The use of public funds to allow the individual to obtain the kind of education he wants is a principle which appears to be growing in favour. It is clear that the dichotomies church/state and religion/education are not nearly the straightforward matters they might earlier have seemed to be. The rise of the "new schools","free schools", and "commune schools" has been termed a religious movement. There is probably a lesser discrepancy between the basic outlooks of parochial schools and traditional schools than there is between the more "behaviour-shaping" and "contingency-management" oriented programmes in the public school system and the more open, humanistically centred ones. Increasing demand is seen for schools where radical questioning can take place. Thus it seems likely that the more basic issue of diversity in educational opportunity will force a reconsideration of past decisions regarding support of private and religious schools with public funds.

Vocational training is another aspect of education which will be subject to pressure for restructuring. Depending on how broadly "benefits" are considered, cost-benefit arguments could undoubtedly be used to demonstrate a net gain for society from any amount of general vocational skills training. This would be true if there were a high emphasis on self-development, perhaps even more than for conventional vocational training. Thus it is more a political question than an economic one, how much of what kind of vocational education shall be publicly supported. The more liberal the interpretation of the term, the more generalized the training, the less it will be liable to attack from the left as"labelling-as-inferior" those who pursue it rather than the college track.

New institutional experiments are clearly needed for preschool education. Preschool training combined with day care for working mothers is a felt need of the poor.

At the other end of the time scale, pressure for restructuring of post-secondary education will continue. Because of increasing rapidity of job-skill obsolescence, and for other reasons, a concurrent and/or alternating arrangement of work and schooling is tending to replace the traditional sequential arrangement of learn-now-work-later. The new generation is likely to demand an even more drastic restructuring of all organisations to facilitate a synthesis of mind-forming work and educative episodes as the central activity of a self-renewing life. How this is to be provided is the central question relating to structuring of post-secondary education.

One of the most potent forces toward new educational demands has been the altered relationship between man and knowledge. In a way which was not true before the last generation or two, people have come to perceive organised knowledge as essential to the attainment of almost any significant goal value, whether it be wealth, respect, power, enlightenment, health, or tranquillity. As a consequence, a significant fraction of the first, second, and fourth groups above have come to have an ambivalent or hostile reaction toward knowledge and expertise. Knowledge is viewed as a significant weapon of the power structure; the knowledge culture is seen as the predominant socializing and selection mechanism of a manipulative, if not repressive, establishment. Thus a sense of potential access to knowledge has come to seem crucial to success and to survival. A significant amount of the current protest regarding education arises from the perception that, not only does contemporary education poorly equip people to comprehend and cope with their environment, but the patterns of professionalization, research, and recruitment/socialization to the power élite which characterize the educational system contribute powerfully to the repression of those who don't make it into the power élite, and to the captivity of those who do.

Substantially larger percentages of the population than ever before are capable and desirous of being effective actors in the social process. There is every reason to assume that their demands will continue to mount, both for an educational experience which gives them a sense of access to knowledge, and for the opening up of a system of sorting and labelling and credentialling which they view as oppressive.

d. In some sense, of course, all life is an educating environment. The nature of the above-mentioned demands for greater diversity of educational opportunity suggests that the more we move deliberately in the direction of all society being an educating community, the more closely will the opportunities meet the demands of diverse groups. Many of the dysfunctional aspects of the present educational system may be traceable to the discontinuity between the school and the larger community. This discontinuity is felt particularly upon entrance to the school, where emphasis suddenly shifts from total to cognitive development, and at the high school level for those who are about to enter the "world of work".

e. The differing demands of diverse groups strongly implies that appropriate content and educational processes will be different for different groups. To whatever extent humans actually tend to follow such a hierarchical sequencing of developmental stages as is suggested by the work of Maslow, Graves, Peck and Havighurst, Loevinger, and others, appropriate educational opportunity may be defined as that which will facilitate the person's moving to the next stage of development he is reaching toward. One implication of this kind of theory is that the individual himself is a better chooser of appropriate educational experiences for him than are the experts. Educational policy structured on the basis of such a premise regarding natural human development would be radically different from traditional policies, and would come much closer to satisfying the demands of the first and fourth groups listed above.

f. The point above regarding "access to knowledge" argues strongly for more attention, for the first two groups particularly, to experience with the process of obtaining knowledge. Perhaps nothing would contribute more to the success of education for the poor and disenfranchised group than repeated success in the experience of gathering, utilizing, organising, augmenting, and ultimately disseminating a knowledge base (about their own community, for example) which they perceive as relevant and useful and over which they exercise continuing control.

6. EDUCATE FOR COPING WITH AN UNCERTAIN FUTURE

The nature of the alternative futures suggests that education which is at all responsive to the two predominant characteristics of the future - uncertainty and rapid change - will emphasize development of a high degree of flexibility and an ability to cope with varied conditions. This implies emphasis on the ability to gain new skills, over acquisition of any particular knowledge; on having access to knowledge, over having memorized any particular knowledge; on the development of a basic self reliance, over a rigid way of coping with the present world. This perspective would affect all aspects of education. The general curriculum would include heavy emphasis on dealing with wholes, rather than specialities, even from the primary grades. (Some examples are the systems way of thinking about problems, an ecological view of the environment, a holistic history of man on earth, an alternative-futures emphasis in viewing present problems.) Vocational training programs would be completely altered, stressing learning to learn and probably leaving the acquisition of specific skills to on-the-job training. Higher-education studies would stress development of a futures outlook. Recruitment and training of teachers would be altered perhaps most of all, since the other changes are so contingent upon a different type of teacher skills being available. Emphasis throughout would be on an appropriate balance between structured and self-appropriated, self-motivated learning, and between cognitive and affective-conative development.

a. What has gone before suggests that education for the future needs, above all, to be based on two complementary concepts. The first is universal access to educational opportunities which will enable persons to live meaningful and dignified lives without direction from the state. The second is education to develop a sense of alternative futures, and of participation in choosing the future of the planet and of the human race. Because of the diversity of human characteristics, this implies also education toward a pluralistic society in which individual differences are not deplored or resented, but valued. Given the uncertainties of the future, we need to cherish the different standards and life styles of those who live in the "social interstices"; these subcultures may be needed as models.

If any one fact stands out about the world of the future, it is this: There is no such thing any more as a single-line life work. At all levels and in all areas we need flexible, multidimensional people. Perhaps no concept would have more effect on educational policies and practices than this, if it became a vitally operative goal.

b. High research priorities are indicated with regard to several areas. The most obvious, perhaps, is the broad area of change and growth, in the direction of heightened self image, increased self reliance, greater flexibility, and reduced insecurity. Another is experimental learning processes which present alternatives to the teacher/student, linear-curriculum, traditional classroom relationship.

c. Similarly we need to aggressively foster new institutional trial forms and radical pilot experiments, particularly in the area of teacher training. We need new ways of thinking and perceiving, of organising and presenting knowledge. The old departmentalized, compartmentalized knowledge presentation is not suitable education for the future. Because of the rapid obsolescence of job skills, in-service training in all areas, and especially in the educational profession, needs to be far more developed.

d. Educational environments in general have been commented upon in the foregoing. At this point let us focus on what the above analysis seems to indicate for the environment of teacher training.

All we have said points strongly to the proposition that the education of educators should be trans-disciplinary, problem-centred, and change-oriented. Very likely it should be restructured to include earlier entry into active teaching, and much greater reliance on in-service training. Among emphases to be strengthened might be alternative-futures thinking, the Western intellectual tradition, human development in the broadest sense, development of access to knowledge, and education toward social-aid roles. Particular attention needs to be paid to recruiting and holding within educational professions the highest calibre persons. This implies that the educational environment for future teachers needs to be open, challenging, humanising - and that the environment in the schools has to be congenial to, and conducive to attracting and retaining, self confident, highly motivated, humane, high-self-image persons.

"Teaching" which is responsive to the needs of the future will be much less a matter of purveying information, and much more a matter of asking questions together. The teacher with a high degree of self knowledge will be less dependent on his stored external knowledge. He will be unthreatened by an atmosphere of shared learning and mutual respect between "learner" and teacher". He will be less likely to fear showing his inadequacy or ignorance, less likely to stick to the material he knows, less likely to be an impediment to the learner's progress. Thus development of self knowledge would appear to be a highly desirable component of the teacher's preparation. To supply this would require a significant departure from traditional school of educational environments.

e. A number of the comments above relate to appropriate content for future-oriented education. One further point deserves special attention.

One of the most serious lacks in secondary and higher education, as viewed from the world macroproblem standpoint, is subordination of training in asking fundamental questions to the development of expertise in dealing with lesser questions. As an example of what is meant by these terms, consider the historic problems of the early residents on these shores and the solutions adopted - removing the Indians by liquidation and confinement to reservations, and getting agricultural work done by importing slaves. The more fundamental problem of human justice was slighted, and the consequences have affected the entire history of the nation. Today our technological and environmental problems seem serious enough. But if we approach the secondary problem of pollution without due attention to the underlying fundamental problem of the totality of human needs, or the problems of applying biotechnology to "improve" persons or society, without adequate attention to the fundamental problem of individual rights, experience has shown that this generates "unanticipated consequences". At this point in history particularly, development of this awareness of fundamental questions is an essential ingredient in the education of society's leaders.

f. Much of what has been said above argues for educational processes which develop self growth and self esteem, inner security to tolerate uncertainty and ambiguity, futures orientation, confidence in ability to acquire knowledge, holistic perspective, and problem-solving competence.

The real time acceleration in technological change and diffusion which has increasingly characterized the recent past will certainly dominate the near future and several of the year-2000 projections as well. Therefore the educational system in most alternative futures must develop better ways of coping with the problems of decay in competence among professionals within their working lifetimes. The whole area of in-service training should become an even more developed area than at present.

The already critical lack in technicians (as apart from professionals) is a significant harbinger of some of the less attractive alternative futures. Vocational education should be significantly improved, and the educational system may have to undertake a major effort to change the value pattern in our society so that being a technician connotes status rather than disparagement.

Concluding Remarks

By way of summary, we want to emphasize again the caution about these findings being tentative and preliminary. Yet if the alternative future histories are at all on the mark, the fact that half of the year-2000 states are authoritarian in character indicates one of the more likely dangers ahead. Other dangers are reflected by the very high proportion in which recession is the mood in the United States and hunger and chaos are endemic in most developing countries. The overall message is clear. There is not much point in attempting to educate only for happy individuals in a carefree world.

To the extent that one believes that the analysis of the roots of the "world macroproblem" holds up, to that extent he will believe that the paramount educational task of our time is the altering of the dominant basic premises, perceptions and values of the culture of the developed world.

ANNEX

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